The Builder.

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THE exhibition of recent British manufactures, which has been opened this week at the Society of Arts in the Adelphi, will be found more satisfactory than the first, and gives evidence, still small though it may be, of the employment of good art for every-day purposes.* It must not be regarded as even an approach to a representation of what the kingdom can do,—there is not room in the apartments for other than a certain class of examples, and some manufacturers require to see very clearly the advantage of sending specimens of their productions for exhibition before they can be led to do so; they do not like the trouble, or begrudge the cost of carriage, and some few have a notion of keeping things to themselves! They do not understand that "there is that scattereth and yet increaseth,—and there is that withholdeth more than is meet, but it tendeth to poverty." This, however, does not lessen the praise which is due to the Society of Arts for these exhibitions, and for the other steps they have taken for promoting the application of the arts to the improvement of the manufactures of the country. The exhibition will grow, and if the society succeed in an object they have now in view, the exhibition will become NATIONAL, and fairly represent British industry and taste.

A rock on which the project may strike may be just dimly seen below water by the observant visitor on the present occasion: it is inscribed *clique*,—but as we would say nothing to discourage, and certainly nothing that might be construed into fault-finding, we will simply bid the pilot look out a-head, have no object in view but the port of General Good, and the voyage will not fail to be both pleasant and prosperous.

The manufacturers who have contributed on the present occasion are seventy in number, and we would especially direct attention to Minton's tile pavings, Jordan's machine-carvings, and the Coalbrookdale iron-castings.

The new scheme of the Society of Arts already referred to, and relative to which the council have attended the Board of Trade, is,—That the places where Schools of Design are established, should, in rotation, have the advantage and use of the collection made in London every year by the society; and to do this, the society suggest that the manufacturers and proprietors of the chief specimens should deliver them over to the council of the Schools of Design, to be sent for gratuitous exhibition to the students and public generally each year, in such provincial schools as the council may think fit. The council urge as a reason for the step, that the students in Government Schools of Design throughout the country, should be rendered familiar with the most recent works in art and manufactures; that the manufacturers, who must be the future employers of these students, should be more closely connected with them; and the public taste improved, for the due appreciation of their joint productions.

They further propose, with the co-operation of the Board of Trade, that the Society of Arts shall, every fourth year, make a collected exhibition of the principal subjects exhibited in the previous three years, and of others expressly prepared for the special purpose; and that such national exhibition shall take place in some large building purposely provided, if not at the cost of the Government, at least with the Government sanction. And they suggest that the site which offers the greatest advantages for such a building (to be of a temporary character) would be Trafalgar-square,—considering that it affords abundant space, and a provision of water for specimens and models best exhibited in connection with water; and offers facilities for a structure of economical character, inasmuch as there is already a good pavement, and three sides more or less available in a building for such temporary purpose.

Government sanction to the erection of such a building would have to be obtained; but they say, if there should be any reluctance on the part of Government to undertake the risk of the structure, it is believed that other responsible parties might be found to do so. The admission to the exhibition to be partly free and partly by payment; and the receipts to be applied, in the first instance, to the payment of expenses incurred in forming it; in paying for the honorary medals and rewards to be distributed to artists, manufacturers, and art-workmen, and for forming a fund for future exhibitions.

As we long ago urged the advantage of such an exhibition, it is scarcely necessary for us to say that the proposal has our hearty concurrence.

Would that we could make more rapid progress in the production of designers, or, at all events, in the artistic instruction of the public, than is now the case! But those who should guide the movement flounder sadly; in some cases absurdly interfering in matters out of their province, and which they understand not; and in others countenancing the weakest productions and the most inefficient arrangements. We can illustrate this assertion on the instant, by reference to the first part of "Ornamental Designs for Decoration and Manufactures, published under the authority of the Government School of Design," of which, luckily, only a few copies are yet issued.

It appears from a report of the council that good copies of decorations being needed for the provincial schools, Herr L. Gruner was selected to prepare and publish such a work in ten parts, each containing six plates (afterwards arranged to be in 20 parts, each containing 8 plates), at a price not exceeding one guinea each part. To shew the importance of producing a standard work on ornament, the council observe—

"that the taste for decorative design, in all its various branches, is greatly increasing in this country; that none doubt the commercial value of art to every species of our ornamental manufactures; and that, in the absence of good works on ornament, published in this country, many foreign cheap publications of objectionable quality are imported, and are eagerly sought for and purchased by manufacturers and artisans; so that already in their productions there is perceptible a *baneful influence*, which the council believe would be *remedied by a liberal diffusion of the work now projected*, inasmuch as it would serve extensively to promote the cultivation of correct taste, by putting into the hands of practical designers numerous examples of the highest excellence.

From the careful study of these copies of original examples, and the explanations with which they will be accompanied, will be derived the means of invention, and ultimately the power to produce original designs; for the council feel assured that, for the education of designers of ornament, the proper course is first to present for study *examples classifically excellent*, from which the *principles* of ornamental art may be deduced.

The council cannot conclude this report without repeating the expression of their conviction that the work which they recommend to be undertaken, will be found to be *an important instrument for the promotion of correct taste*, and will be highly useful to the numerous industrial classes for whose special benefit it is designed. That there is great want of such a publication in this country is fully demonstrated by the number of foreign works imported. They would further observe that, although the estimated amount of expense may be deemed large,* it has been, on due deliberation, considered essential; and that, if schools of design under the sanction of Government are to be maintained, they trust they may be enabled to produce *such works of instruction* as are necessary *to ensure to their operations a high character and beneficial results.*"

In consequence of this report, the subject was referred by the Committee of Privy Council for Trade to the Lords of the Treasury, and the publication of the work was sanctioned by the Government.

The work being required for such a purpose, so heralded, produced under such authority, and apparently considered beyond the capabilities of an Englishman,† we naturally expected would be a first-rate production, calculated to exercise a beneficial and lasting influence on decorative art in this country. What is the fact? The first number is now before us: it contains the following plates (each 24 inches by 20 inches):—1. The Roman Doric order (?); 2. Tarsia, or inlaid wood, fifteenth century. Fra Giovanni; 3. Richly chased arms, historical museum at Dresden; 4. Painted arch round a tabernacle, by Luini; 5. Ancient painted frieze, from Pompeii; 6. The marble room, Palazzo del T. at Mantua (ascribed to) G. Romano; 7. Detail of parts of the principal frieze of ditto; and, 8. Ornaments in chiaro-scuro at the Academy at Venice: and we have no hesitation in saying, it is discreditable to all concerned. So far from its diffusion being likely to remedy "the baneful influence" spoken of by the council; so far from affording excellent examples "from which the principles of ornamental art may be deduced;" so far from being an "important instrument for the promotion of correct taste," or such a work of instruction as will insure to the operations of Schools of Design "a high character and beneficial results,"—we scruple not to say that the majority of the plates are calculated to produce a bad taste, and do much more harm than good.

Some of the "richly chased arms" might have come from Mexico or the Sandwich Islands; the "ancient painted frieze from Pompeii" is positively detestable; and the decorations of the room said to be painted by G. Romano are so ill designed and so badly drawn (at least in the book before us), that if any master were to place them as copies before his pupils it would be most satisfactory proof of utter unfitness for his office.

Mr. Gruner is himself a good artist, and

* The exhibition first opened on Wednesday evening, when Sir John Boileau took the chair, and Mr. Scott Russell, the secretary, read an introductory paper.

* About 700*l.*, we understand, have been already paid on account of it.

† The only references in the number (on the first plate), are part in *French*, part in English, viz.—"Names of the *membres* of the base and pedestal;" "names of the *membres* of the entablature;" "names of the *membres* of the capital," &c.

published some time ago a beautiful book, to the excellence of which we bore willing and honest testimony. It is the selection of examples which we mainly condemn in the work now before us, and as it is just possible that with this he may have had nothing to do, this admission is due to him. If we understand rightly, no copies of this first part have been issued to the public, and we would express an earnest hope that none will be. For the credit of the Government School of Design let it be cancelled forthwith.

ON THE GEOMETRICAL LINES AND OPTICAL CORRECTIONS OF THE GREEK ARCHITECTS.*

I NOW proceed to that part of the subject which is more particularly the object of the present paper, namely, the optical corrections. I shall first state the case as I found it, and lastly, say a few words on the probable origin and intention of these subtleties, which prevail, more or less, in almost all the Greek temples. In all, indeed, that I have examined, with the exception of the Temple of Bassæ, on the borders of Arcadia, where I could not find satisfactory indication of either convexity of pavement, or inclination of the columns, or even entasis.

The pavement of the Parthenon is bounded by four curved lines, viz., the edges of the upper step on the four sides of the building. The four angles of this curved surface are not precisely level, the south-west angle is about ·16 above the north-east and south-east angles. I think that this is simply owing to the lines of the earlier temple, which were also curved, being made use of as far as they would go, and by being produced in one direction only, and remaining fixed at the south-west angle. The line so produced would naturally fall below the fixed point.

This is the case on the west front, south, and north sides. The extreme points of the upper step of the east front are exceedingly near level.

The result of a number of observations gives only a difference of ·002, or $\frac{1}{500}$ feet, a quantity which we need not stop to discuss.

If these two points be joined by a straight line, the curve which forms the edge of the step will be found under the middle columns to rise to a height of ·214 above it. If the uniform curve had been preserved, it would have been ·218 in the middle, which is about $\frac{1}{230}$ breadth of front; and the curvature is so regular on the northern half of this front, where the steps rise immediately from the solid unbroken rock, and consequently no settlement can have taken place, that of four points measured at the centres of each column, three agree exactly with a circular arc: the fourth differs only by ·003. The curvature is so very slight that it might be any regular continuous curve; for instance, in so small an arc no appreciable difference could be shewn between the arc of a circle or that of an ellipse or parabola, and I think that the work was set out by means of the latter figure, which might be done very easily; whereas, I need scarcely point out the difficulty, or rather impossibility, of using the circle, which would require a diameter of about 2¼ miles.

Let it be required to construct a circular or other arc of uniform curvature, whose length is 100 feet, and the rise at the centre is to be ·25, or any other small measure which must not much exceed one foot.

Construct with any axis a parabola, and set off from the vertex AB = the proposed rise, and draw LM at right angles with AB.

Now, LM will represent the 100 feet horizontally, and ordinates drawn to the curve perpendicular to LM will determine the exact rise at as many points as may be required, full size.

The curve on the upper step north side of the Parthenon, also approximates to a regular curve very closely; its entire rise in the centre above the line joining its extreme parts, is ·356, which is very nearly in the proportion of $\frac{4}{5}$ of the rise in the east front: it is exactly $\frac{1}{840}$ length of the building.

The curve on the south side seems to have been identical with the north side, but it has suffered more from the concussions which the building has undergone, especially as there is a great depth required on this side of artificial foundation. On the north side the steps rise almost immediately from the solid rock. The curve on the west front is not quite so symmetrical as the other sides. It has, I believe, been affected by the lines of the old building. The rise is exactly the same as the east end.

The upper members on all four sides follow the steps, and are nearly parallel, but there is a little more curvature given to the steps; the entire rise of architrave is ·173 on east front, ·175 on west. The levels of those portions of the entablatures which remain on the north and south sides point out the directions which those lines had originally, and they were as nearly as possible parallel to the line of the step, excepting that just at the angle columns the step has a little the more declension. The frieze and cornice are exactly parallel with the architrave. In the Temple of Theseus, also, these curves prevail; on the fronts the rise is $\frac{1}{700}$ part of its length, on the flank $\frac{1}{815}$. The lines in the architrave are exactly parallel to the step.

There is one refinement which the Temple of Theseus possesses which the Parthenon is without. In addition to the cornice being raised, the inclined lines of the pediment have a very slight convexity, between ·02 and ·03. I was unable to fix more precisely the amount. I imagine that it was owing to some degree of haste, in which the Parthenon was finished, of which there are several indications in the upper members, which prevented this final adjustment being made to its pediments. The state of the political horizon at that time making the completion of the long walls of more immediate importance than the optical corrections of the Parthenon. On a former occasion, when I read a paper to this institute, I stated my impression that the cause which led to the adoption of this convexity of the horizontal lines, existed in the contrast of the inclined lines of the pediment.

Mr. Ferguson, who has, I understand, promised to read us a paper on Indian architecture next evening, has kindly favoured me with an illustration, which I will read to you, from a description of the construction of an iron foundry at Kasipur, near Calcutta, built in the year 1834. The foundry is covered by a single roof, with principal rafters, tie rods, and suspension bar, from the centre. The rise is 6 feet and the span 50 feet, which is exactly the same pitch as the Parthenon and Propylæa. The passage is extracted from the fourth volume of the journal of Asiatic Society of Bengal, page 116.

"Before closing our short account of Kasipur roof, we must notice a curious optical deception, for which we are somewhat at a loss for a correct explanation. On entering the room and looking up at the roof, it strikes every beholder that the roof has somewhat sunk, and the horizontal tie rod is about 5 or 6 inches lower in the centre than near the walls.

So firmly impressed were we of this being the case, that standing at one end of the room, and holding two flat brass rulers, over-lapping one another, to the eye, we could readily measure the apparent angle of the tie rod, by raising the ends of the rulers so as to coincide with the two halves of the tie rods.

On mounting the roof and looking in at the upper window at either end, the same effect was still visible, though in a diminished degree, and we were not convinced that it was a deception until Major Hutchinson, at our request, caused an actual measurement to be made by a perpendicular wooden batten from an accurately adjusted level on the stone floor. It was then proved that there did not exist a difference of level even to the tenth of an inch." The writer's manipulation of the brass rulers I do not pretend to understand, but the conclusion is obvious that a straight tie-rod appeared to be deflected; and I have no hesitation whatever in ascribing the cause to the contrasting lines of the principal rafters. I do not think that it is necessary to have our eyes refined by a southern climate for the appreciation of these effects. I suppose that there are very few gentlemen here who have not felt the same disagreeable effect of a flat open roof with horizontal tie-beams, unless, indeed, the latter be very much cambered. That this was the view the ancients took of the matter I am convinced by these two facts—

That the great temple at Pæstum has the convexity only in its fronts, and not on its flanks; and in the Propylæa at Athens, although the base on which the columns of the two pediments stand is perfectly straight and level, the line of the architrave was curved. For enough remains to determine this in the eastern portico—the central columns are actually about ·12 higher than those at the angles. The base in this building is cut in two by the ascending roadway, so that there could have been little or no advantage in a convex base line.

It will be well to remember that the temples at Athens were the result of the experience of several centuries in which these refinements were gradually brought to perfection.

The first process was probably to raise the cornice under the pediments and entablature by making the middle columns a little higher than those towards the angles, as I have mentioned in the case of the Propylæa. Still it is likely that to a fastidious eye the straight line of the stylobate would appear weak.

The second method would be that found in the great temple at Pæstum, in which the fronts have the convexity in their steps, as well as their entablatures, the flanks being composed with horizontal lines. Perhaps a reasonable man should be content with this. I must willingly admit that I was perfectly content with the temple at Pæstum; still nothing short of perfection could satisfy the refinement of vision with which the Greeks alone, among the people of all time, seem to have been endued; and perhaps by looking at a temple constructed as above-mentioned, anglewise, and contrasting the convexity of the corona of the fronts with the straight line of that on the flanks, or more likely the comparison of the two different forms of line on the stylobate, suggested the possibility of improvement; at any rate as early as the time of Pisistratus, the Athenians had begun to demand from their architects the perfected construction, as the foundations of the Temple of Jupiter Olympus testify, which we know were laid during his reign.

I also refer to his time, the earlier Temple of Minerva, which occupied the site of the Parthenon at the time of the Persian invasion, in which also we find that the lines on the four sides of the building were convex. I can bear witness also to convexity on all the four sides of the temple at Nemæa, in the Peloponesus, and Segeste, in Sicily. I could find no trace of convexity at Corinth, Egina, Rhamnus, or Bassæ.

The next subject is the inclination of the columns and the upright faces of the building.

1st. The face of the steps inclines about ·008.

2nd. The columns incline, backwards, a quantity, of which I obtained the following results. From the average of the measurements of all the lower drums, (scamillæ impares, as Vitruvius calls them) ·229. From plumbing the angular columns of the east front, taking into consideration all the cracks and movements which have modified its original position, I obtain two results of ·230 and ·232.

In the plumbing, I observed every precaution to ensure correctness, using a very heavy weight and also watching for calm intervals of weather, which are rare at Athens. I am disposed to think that ·228, or one thousandth part of the length of the building was the amount originally intended. Those gentlemen who remember the perfection of the joints with which the Parthenon is constructed, will allow that the openings between them, which at present exist, are the exact records of all the settlements which the building has undergone, and that by a careful examination of these, the original amounts may be exactly recovered, which would be hopeless in a building which had been of less highly-finished construction.

Vitruvius directs that the columns of the Pronaos and Posticum should be set perpendicular, and those of the Peristyle should incline towards the cella.

In Cicero ad Verrem, we have an amusing passage, in which Cicero relates one of his rascalities; that having under his charge, as Roman governor, a young Syracusan nobleman, whose property was subject to the con-

* See page 112, *ante*.

dition of repairing the Temple of Castor in that city, Verres was exceedingly anxious to make a job of this; so he goes to examine the temple, but was much disappointed on finding it in perfect repair, when one of his companions casually observed, there is nothing here to be done, unless you order the columns to be set perpendicular. Verres was evidently surprised at the observation, for he knew nothing of architecture, and to his eye the columns appeared angular; but it was mentioned to him by those who were around him, and no doubt familiar with the practice of the ancients, fere nullam esse columnam quæ ad perpendiculum esse possit. Namely, that in a temple there was scarcely any column, which by the practice of the Greeks, could be perpendicular. Verres was delighted at finding something to set his young friend about, and said, oh by all means let him set the columns perpendicular, and no doubt he took care himself to superintend the payment.

The object of this adjustment is to correct an appearance of fanlike spreading from the base outwards, which takes place in columns which are all perpendicular. It may be owing to this cause that, in consequence of the diminution of the columns, the spaces between them on the architrave are greater than those at the ground (for the eye quite makes allowance for the counterspread of the capitals). Again, owing to the greater depth of shadow behind them, the upper part of the columns will have apparently more strength of light, and consequently appear greater. The effect altogether produced will cause the architrave, if equal, to appear longer than the base, and consequently the angle columns will appear to lean outwards: this is rectified by making the said angle columns lean a little towards the centre of the building. It is a proof of the wonderful judgment with which this quantity was chosen, that so many diligent and accurate observers have studied and drawn these temples without being aware of the fact. When my attention was first called to it, I could not at all perceive it; and I greatly amused a French architect, who had been for some time at Athens, by asking him which way they leaned: after some days the eye began to take cognizance of it, and I could perceive which way it went.

The impression of strength and beauty resulting therefrom is by no means confined to those who are cognizant of the fact; and I doubt not that many of our earlier investigators have been astonished that the level and plumb imitations of Greek architecture which we have in this country so little recalled to their minds the consummate beauties of the Parthenon and other Greek buildings. No doubt our climate is unsuited to the pure Greek, but this is not enough to account for the falling off; it is not so in our Roman and Palladian buildings—witness the portico of the Fitzwilliam Museum at Cambridge, and the Royal Exchange in London, which do not fall so far behind the majesty of the Pantheon. I particularly name recent English buildings, as they are more fairly compared with our Greek revivals than the time-furrowed architecture of St. Martin's and St. Paul's. Now, if we turn to the Greek Doric, the parallel is certainly less satisfactory: and it must be evident that, although, confessedly, native Greek architecture is high above native Roman, our copies of the former are vastly inferior to our imitations of the latter. Of the former we have only preserved the corpse—the vivifying essence is gone; of the latter the energy may be impaired, but it is not destroyed.

One peculiarity which I noticed is that the antæ lean forwards to meet the columns of the pronaos. This seems to have resulted from the inclination inwards of the columns of the peristyle; those of the pronaos and posticum being perpendicular, the effect would have been to produce a strong contrast between their different positions, and the artifice must have been detected: by the influence of the contiguous face of the antæ, the column (here drawn from the posticum), which is really perpendicular, is made to appear to lean slightly in the same direction as the outer columns.

I have observed that a perpendicular pilaster, when brought very near to a column in a portico or doorway, has the effect of making the column appear to lean forward. The inclination of the antæ is not itself visible, except to a spectator in the narrow space between the inner row of columns and the wall; and when the eye is brought very near to a line, so that it cannot take it in all at once, it is scarcely possible to judge of perpendicularity.

The last peculiarities I shall mention are the differences of the abacus. Those on the east front are of the largest class, the north-east and south-east having the largest in the whole temple; they are 6·858; the others in the east front are 6·755; on the south side they are 6·580, and so are they on the west front. The north-west angle is the same as the ordinary size of the east front, 6·755; the south-west angle is somewhat less; on the north side they are 6·750 in the middle, and regularly decrease towards the angles.

I shall be occupying your time too long if I attempt to discuss the reasons which led to this.

The entasis of the columns is the most wonderful and beautiful of all the curves. It is so delicate, that its existence was for some time doubted; and yet I found by careful measurements, in a manner which was suggested to me by Professor Willis, which I will here describe. A fine harp wire was strained from the top to the bottom, as tight as it would bear, close to the edge of such flutes as preserved a sufficient number of points, with the original surface, and by means of a rule similar to the one I here produce, which is supplied with a vernier, I was enabled to measure from the flute to the wire with the greatest accuracy to about half $\frac{1}{1000}$ foot. I took such measures in several columns of the Parthenon, which I found to be wonderfully true and identical. I measured also the entasis of columns from the Erectheum, Propylæa (both orders), Temple of Theseus and Jupiter Olympius. In those of the Parthenon, Erectheum, and Propylæa, I find the correspondence with hyperbolic arcs, which I have calculated so exact, that the mean of from 14 to 20 measurements in each column differs from the calculated curve less than $\frac{1}{1000}$ foot, and none of them, where the surface was to be depended upon, differs by so much as $\frac{1}{500}$. The entasis of Jupiter Olympius gives also a very true hyperbolic arc. The columns of Theseus are so much worn in their outer edges that I was obliged to content myself with measures within the flutes, which never give such regular curves as the fillets, although the flutes are worked with a nicety far exceeding that found in any other style of architecture.

Still, a mean from four different sections within the flutes gives a very accurate hyperbolic arc, although no one is a perfectly regular curve. These hyperbolas are all chosen with their axes, multiples, or aliquot parts of the attic foot. The Greek architects acted with great judgment and knowledge of the nature of the curve they were employing, as it is the only one of the conic sections which can produce variety in such delicate curvature as they have chosen for their entasis.

I must now advert to some of their mouldings, which are worked with the same perfection, and, as far as I have examined, are all different forms of the conic sections.

The echinus of the capitals of all the Doric columns agrees with various forms of the hyperbola. The soffit of pediment, Parthenon, and Propylæa, and I think of Theseus also shews a hyperbolic arc. This is a magnificent moulding, and worked with the utmost perfection. That of the Erectheum is an equally true parabola. The cymatium of the Parthenon is the only certain circular form which I know, except the torus of base, Erectheum, and Ionic order Propylæa. The flutes, also, are all parts of circles, whose centres are proportioned to the width of the flutes. In this they shewed their judgment, as it would have been almost impossible to have worked pure ellipses; and in these retiring surfaces the value of the perfect variety of curvature of the ellipse would scarcely have been appreciated. Talking of flutes, there is a peculiarity in the flutes of the Parthenon, which does not occur in any other of the temples of Athens. The flute at the neck is deeper in proportion to its width than in the rest of the shaft: during the whole rise, until about 3 feet below the neck, the sagitta or depth of the flute, from its chord, is $\frac{1}{5}\frac{1}{6}$ths of chord. At the neck it is $\frac{1}{5}\frac{1}{7}$ths, which is about $\frac{1}{8}$th part greater. This has a good deal of effect on the column, and gives a richness of effect to the upper part, at the same time that it diminishes the light in that part where it can best afford it, viz., where it is contrasted to the deep background of shade of the upper part of the cella wall,

I have not yet much to say with regard to the colouring of the temple, nor have I much time to say that little, for I fear I must have exhausted your patience. The drawings which are at present made represent the architrave, band, &c., the trigliph, and the string which carries the marble beams which supported the ceiling. There is not a great deal of positive colour remaining in the Parthenon. The underside of the mutules shew some vestiges of blue and red colour, and the upper part of the nook of the triglyphs, here and there on the east front, preserves some blue. One of the antæ of the Posticum has a tolerable supply among its eggs of blue and green, and some red. The flowers which decorate the cymatium and other mouldings have no trace of positive colour, but the drawing of the ornaments upon them is in many places clearly to be made out.

My companion, Mr. Willson, paid much more attention than I was able to bestow on this subject, as I was almost entirely occupied with the levelling department. He is at present in the country, or I should have been able to produce more illustrations of this part of the subject. I fear, gentlemen, that you will consider that I have been making much ado about a very little or nothing. That it is all about a a very little I willingly grant, but that that very little is nothing, there lies the whole question.

F. C. PENROSE.

TESTIMONIAL TO MR. THOMAS CUBITT.

A COMMITTEE of the Builders' Society, comprising Messrs. Elger, Grissell, Grimsdell, Haward, Herbert, Kelk, Lee, Peto, Piper, Rigby, Smith, and Stephens, has been organised for the purpose of presenting to Mr. Thomas Cubitt a testimonial of the respect and esteem of the builders of London, to which he has entitled himself, as they justly urge in their address, by his general integrity of character,—his constant endeavours to promote kindly feelings, as well amongst the builders generally, as between them and their workmen, thus inducing a feeling of mutual dependance and community of interest between the employer and the employed,—the anxiety he has also evinced for the improvement of the moral and social condition of the workman,—and his constant and successful efforts to raise the Building Art to a high standard, by judicious improvements in the construction of buildings, based upon original and costly experiments.

The committee have determined that the object will be best attained by the presentation to Mr. Cubitt of his portrait, painted by a distinguished artist, and that an engraving shall be made from it, of which a copy is to be presented to each subscriber. They appeal to the builders of London to assist in carrying this into effect, and will doubtless meet with that hearty response which the proposal merits. Men like Mr. Cubitt, whose example tends to elevate a whole class, make every member of that class their debtor. The subscriptions already received amount to about 350*l*.*

THE CURVE OF POINTED ARCHES.

SIR,—Unless I greatly misapprehend Mr. Laker in his communication upon the "Curves of Gothic Architecture,"† he appears to have made two rather remarkable oversights or mistakes. He says—

1. "Let any one examine our best churches, and he will perceive that the curve has more point at the apex, and more perpendicularity at the base, than the single arc of a circle could produce."

But the constructive diagram proposed by him gives *less* perpendicularity at the base; that is, at a given height—say 1 foot above the springing line—the curve is at a greater dis-

* Mr. Herbert (Cavendish House, Clapham-common), who acts as treasurer, or any member of the committee will receive subscriptions.

† See p. 40, *ante*.

tance from the tangent or perpendicular than by the ordinary single arc method.

2. "The product of the minor radius and the complement is always equal to the product of the abcissa and ordinate; *i.e.*, $r s = x y$."

Instead of *always*, this is only the case with arches of one particular proportion, which happens to be that of Mr. Laker's diagram, or nearly so.

This correction does not affect the other theorems; but can Mr. Laker verify the proposition that the curves are compound by measurements of arches so constructed? or is not the appearance an optical deception, arising from the position of the eye, or from the pier or bowtell caps being under the springing line, as is sometimes the case, or from the deep series of concentric mouldings on different planes? W. R. CORSON.

Leeds.

SIR,—Is not Mr. Laker incorrect in that portion of his inference which deduces $r = \frac{y^2}{\sqrt{x^2 + y^2}}$ from r as a mean proportional between the height y and the chord?

Or does he mean that the height y is a mean proportional between the minor radius and the chord which would lead to the equation he has obtained?

As the equation stands now it vitiates his definition. MATHEMATICIAN.

London.

Having submitted the above to Mr. Laker he replies as follows:

"I am greatly obliged by the courteous and friendly strictures of your correspondents.

"Mathematician" has pointed out an extraordinary misplacement of terms in my second theorem, namely, that "the *minor radius* is a mean proportional," &c.; whereas the reading should be:—

"*Theorem* 2.—The minor radius projects the lower portion of the curve. The height, or rectangular ordinate y, is always a mean proportional between the minor radius and the chord joining the apex and base. The value of this chord, calling the half width or abscissa, x, is by the well-known property of the right-angled triangle, $\sqrt{x^2 + y^2}$. (*Eucl.* i. 47.)

Hence, $r = \frac{y^2}{\sqrt{x^2 + y^2}}$."

I beg pardon for this oversight, but that it was merely accidental, is manifest from the fact, that my whole argument is built on the correct assumption.

I must, however, contend for the universal truth of the equation, $rs = xy$. Mr. Corson's diagrams* exhibit the general application of my theory to all pointed arches. They also shew its superiority for *ensuring* point under all circumstances. This would be very evident in an arch whose height should equal the half-width.

In the diagrams, your correspondent has understood $x + y = r + s$; but this is a misapprehension.

It may be proved that $r = \frac{y^2}{\sqrt{x^2 + y^2}}$, and that $s = \frac{x}{y}\sqrt{x^2 + y^2}$. Let these two values of r and s be multiplied into one another, and the product will be xy, as was proved geometrically.

As I do not contend about words, I confess that the remark about "perpendicularity" should have been qualified. The idea in my mind was, that with the *same* base I obtain *greater* aspiration: a circumstance very accordant with the genius of the pointed style. My object has been to prove that pointed arches of *all* proportions may be (and probably were) struck by one uniform equation. If I have succeeded, let me humbly hope that I have done the *style* some service, and that Tudors need not be left to the "rule of thumb."

THOMAS LAKER.

Wavertree, Liverpool.

LECTURES AT THE SOCIETY OF BRITISH ARTISTS. — Mr. Hurlstone, the president, closed the school season on the 4th inst., with an able lecture on Spanish art.

* For which we have not space.

DWELLINGS FOR THE WORKING CLASSES.

THE EXTERNAL GALLERY SYSTEM.

SIR,—The construction of appropriate dwellings for the working classes has of late attracted much of the public attention, which it highly deserves, both in a moral and in a sanitary point of view. You will, therefore, I trust, excuse my offering to your notice a few remarks on the advantages, which, in the construction of a lodging establishment on a large scale, might be derived from the adoption of a system of external galleries, or balconies, constructed along the front of each story throughout the whole extent of the building, and connected with each other, and with the ground, by staircases at distant intervals. This peculiar mode of forming a communication between the various parts of a building is frequently practised in Italy, especially in the court-yards of large inns; and one form of it is exhibited in plate 9th of the work lately published at Brussels, under the title of "Projet d'association financière pour l'amélioration des habitations, &c." Par F. Ducpetiaux.*

In framing the following considerations, I have assumed the galleries to be constructed in the most economical manner, consistent with perfect safety; to be supported one over the other by wooden or iron pillars, about 12 feet apart; to be 4 feet wide, guarded by a light iron balustrade or railing, and paved with tiles, or slate, or any other appropriate material. I do not, however, wish to lay any stress on either of these particulars, my intention being to shew the practicability and usefulness of the system, in a general point of view, leaving its details to professional men.†

1. I consider one of the chief advantages of the proposed plan to be this, that the occupants of the higher stories would possess almost the same facilities for neighbourly intercourse with all those residing on the same flat, as if they lived on the ground-floor; and the look-out from the windows, enlivened by frequent passers by, would present nearly the same degree of cheerfulness; whilst at the same time any intrusive prying in at the windows, could, besides the usual impediment of muslin blinds, be prevented by raising the level of each flat, two steps above that of its external gallery.

2. The several galleries would afford covered walks for bad weather, and an agreeable lounge, where the tired workman could sit and smoke his pipe on a summer evening, his wife usefully engaged at his side, and his children cheerfully playing about him. These galleries could, moreover, be agreeably enlivened during the fine season by flowers, reared in pots or oblong boxes, and especially by climbers, trained along the balustrade and up the columns.

3. The galleries being connected with the ground by staircases at both extremities of the building, would afford a more effectual security against danger from fire than the expensive stone staircases which have been had recourse to.

4. Peculiar facilities would be afforded, in a variety of ways, for drying the linen of the inmates, without the necessity of travelling up and down stairs, as is usually the case in buildings of many stories. I have seen practised in Italy a method of hanging the linen on an endless line passed round pullies, which are placed opposite each other, on the two sides of a street or court-yard. The plan was evidently so successful, that I should feel disposed to give some account of it, but that it may very possibly be already known in England, though I have not had occasion to witness it. This contrivance might be very well managed from window to window, across an ordinary street, by agreement between the parties concerned; though, of course, I should not think of recommending it, save in unfrequented localities and blind alleys. But its adoption would be much more convenient and unobjectionable where there were two series of external galleries facing each other.

5. In buildings possessing no horizontal access from one part to another, and separated, as it were, into a series of distinct houses, with only two families on each flat, the inmates are generally deprived of the convenience of having little articles of household consumption brought to their doors, either by the shop boys, or by itinerant venders; whereas, with the system of external galleries, these persons would ply from door to door throughout the whole extent of a second, or fifth story, with much the same amount of time and trouble as if their customers were all inhabitants of the ground-floor. I may add, that many of the inmates, whose age or infirmities incapacitated them for active occupations, might apply themselves to shopkeeping in the small way, with as fair a prospect of attracting the custom of their neighbours, or neighbours' children, of the same floor, as if all were tenants of a row of cottages.

Circumstances of the nature of those referred to in the foregoing paragraphs may seem trifling in themselves, but they would contribute very much, in the aggregate, to give to apartments in an extensive and city-built lodging establishment, a character of cheerful and sociable homeliness, which buildings of that description are generally very far from possessing.

With regard to the expense of the proposed plan, as compared with the usual mode of building, I am not prepared to give any estimate; but it must be borne in mind that the whole, or the greater part of the space usually occupied by flights of stairs, in the body of the building, which are very expensive when required to be fire-proof, would become productive, by being available for additional apartments; nor can it be alleged that the galleries would be an encroachment on the public way, as they would only occupy the width of the foot pavement, which would thus gain a desirable protection.

I had intended noticing a few other points, such as, for instance, the facilities which would be afforded by the gallery system, for the introduction of economical arrangements with regard to fuel, water, and gas; but I find that these subjects would involve a discussion of pros and cons, relative to the expediency of applying to the occupations and wants of the working classes, those principles of association, and clubship, which have hitherto been chiefly confined to the pursuits and enjoyments of the rich. This is a subject open to controversy, and on which men are seen to disagree whom one would suppose equally possessed of the best information and soundest views; whilst on those points on which their opinions coincide, deeply rooted popular prejudices too frequently present an almost insurmountable obstacle to the adoption of the measures they recommend, even though experimental proof in this country or abroad may have demonstrated their practicability.

A disquisition of such a nature would swell this letter to unreasonable limits. I may, however, be allowed to state my conviction that suitable and well-contrived economical arrangements, such as could easily be combined in the construction of a large metropolitan lodging establishment, and especially in one built with external galleries, might afford the means of effecting a saving of at least 20 per cent. in the usual outlay of the working-man for his daily sustenance;* and that this desirable result need not be confined to men or females living singly, but might be obtained in establishments for families, not only without any proportionate diminution of comfort, and without any infringement on decorum, but with a furtherance of humanizing influences, and of opportunities for intellectual development.

There is another measure by which I believe that a very material benefit might be conferred on the industrious artisan, viz. the formation of regular *ateliers*, or work-rooms, fitted up with the requisite conveniences for such of the manual trades as are susceptible of being carried on in company. This is the case with most of those handicrafts which are usually practised by females; and I consider, indeed, a commodious work-room for needle-women,

* This very useful work, which reflects credit on the sagacity and perseverance of the author, may be procured in London.

† The use of external galleries we should mention is not unknown in England, and has been alluded to before now in THE BUILDER. In Liverpool there is a pile of dwellings, known as Kent-terrace, if we remember rightly, so constructed.—ED.

* See the number of the "Labourer's Friend" for October 1847, page 181.

with an ample supply of sun-light throughout the day, and of gas-light at night, as an almost indispensable appurtenance of a well-organized lodging-house for females.

On the preceding measures, and on others calculated to equalise the demand for some kinds of manual labour, and to ensure to its products a more direct transit from the producer to the consumer, I shall perhaps have, at some other time, an opportunity of entering into further detail; I shall perhaps then endeavour to point out in what manner they might either be adapted to that condensed form which concentrates so many valuable architectural and economic lessons, in the model buildings of the Labourer's Friend Society, or be carried out by the directors of the Metropolitan Association under Royal charter, on a scale of development commensurate with the vast resources which will, I doubt not, be readily placed at their disposal by capitalists, if the latter be properly appealed to, while the fickle breeze of public sympathy is blowing fresh in favour of philanthropic investments.

Twickenham. T* T*

THE ITALIAN OPERA HOUSE, COVENT GARDEN.

We mentioned briefly a short time since, that a great improvement was being effected in the upper part of the auditory, by removing the floor which separated the amphitheatres and the gallery, and forming one general incline, which, under the titles of "box stalls" (the front portion) and "amphitheatre," will give good accommodation to about 600 persons at a moderate price. The appearance of the house is little injured by it; indeed, it gives an effect of space and extent which it had not before. Its recommendation to us, however, is that of providing the opportunity of hearing the finest productions of the finest composers, given by a company not to be equalled in Europe, for those who may not be able prudently to pay large prices for the enjoyment. We would have music as universally cultivated in this country as we would have design: the enjoyment of both is open to the meanest capacities and to the humblest individuals, and we look for the time when it will be considered not a luxury but a necessary, and all be qualified and able to receive it. As was said to Mr. Wyse by an intelligent foreigner, when some doubts were expressed of the possibility of generally diffusing these arts in England: "Music! why music is speaking: Drawing! drawing is writing: both are pastimes only of the common education of every human being."

Several other improvements have been made at the Opera-house under the able direction of Mr. Frederick Gye, (who is now the general comptroller there), especially at the entrances, arrangements for giving back cloaks, &c., speedily;—little matters not beneath the attention of architects who would adapt their buildings perfectly to their destined purpose.

PROGRESS OF THE GAS MOVEMENT.

In so rapidly accelerating a ratio is the gas movement making way, that the necessarily restricted limits devoted to such a subject in The Builder are getting less and less capable of keeping pace with it, even in the briefest record of each and all of its fastcoming minor phases and events; so much so, in truth, that we feel not a little like that worthy wight who raised a regiment of aerial imps, whose *gaseous* forms he forthwith found it far beyond his power to order and dispose of as he wished. We must, however, make at least an energetic and industrious effort to condense as many of them within the limits circumscribed as possible, leaving as many more, it may be, to pirouette upon the point of our Perryan penholder until further orders.

It is scarcely news, to most of our metropolitan readers at least, to intimate now that in London, Lambeth, Kennington, Camberwell, Marylebone, and, in fact, the metropolis at large, the movement downward in price—but upward in prosperity, as we have prophesied before — has fairly begun. The Phœnix, the City of London, and the South Metropolitan, no less than the Imperial and the Chartered Companies already referred to, — all, more or less recently announced a forthcoming reduction of price to 6s. per 1,000 cubic feet; so that what was lately an average metropolitan price of 7s. to 8s., has been already pretty well reduced to 6s., and, in all probability, will, ere long, step further downwards towards the level of public expectation, pitched, as it latterly has been, on the tangible, practical, and explicit basis of Mr. Leslie's evidence of possibilities—namely, 3s., more or less. Alarmed at the movement of the City Sewers Commissioners, and the evidence thus adduced, the City Gas Company have followed the example of others—in *so far* doing what we have so often urged them all to do, even for their own sakes.

Since our last abstract of progress, too, in the provinces, the movement downwards in price has been general. At Woolwich, for instance, not only have the Admiralty obtained a reduction of the charges on their extensive establishment to 6s., but a general reduction to 5s. 6d. has been since announced, along with a notice of increase of dividend to 6 per cent. As the *Daily News*, in announcing this reduction, justly remarks, the beneficial effects of a well-timed competition have been strikingly exemplified in this very case. For many years the charges of the old company were 15s., which, by stiff struggles, were reduced at length to 13s., and then to 11s., when further they declared it impossible to move, until the actual formation of a new company jogged them onward to 9s., which they at the same time declared to be a ruinous price. The new company, however, having been notwithstanding fairly set afloat, with a charge of 8s., to begin with, down came the *ruined* Company—not to a state of bankruptcy, exactly, but—to a general charge of 6s.! The tradesmen preferred paying 8s. to their *own* company, nevertheless, until a stipulated guarantee fund of 1,000*l.* was realized, when the reduction announced, to 5s. 6d., was made, and the dividend, notwithstanding, as we have said, increased,—thus literally fulfilling our repeated prophecy, that with a downward price, we shall see an upward dividend, as indeed the whole of the returns already made to Parliament also evidence, and as the more especially parallel case at Liverpool,—so like in its detail to that at Woolwich,—also gives remarkable proof. In that case, if our readers recollect, the company, after being literally *pulled down* from 45s. to 15s., 12s. 6d., 8s., and 7s., declared that it was *utterly impossible* to make gas at a lower price,—then to 5s., when there was another dead stop, as *it* was declared to be *a losing price*,—then down to something less than a losing price, viz., 4s. 6d., which their own 'chief clerk' at length, in evidence, declared to be a very good reason why they should—raise it again? by no means, but—reduce it even to 3s. 8d.! And, in truth, the *ruinous*, losing, and impossible prices actually realised the highest dividend allowed by their acts, viz. 10 per cent., which was shortly afterwards announced! and that, too, in the face of a constant rise in the price of coal!! But our present purpose is neither retrospective, argumentative, nor illustrative, but simply registrative. We must, therefore, proceed with our record of progress.

While the people at Newark are paying 7s. 6d. to the Company there, the Midland Railway Company, in the same locality, are now manufacturing the article at less than 2s. 6d.! These elements of discontent are rapidly fermenting into a new leaven at Newark.——The Huddersfield registered Company have announced a reduction to 5s.; the Bradford a like reduction from 6s. to 5s.; the Cambridge a like reduction from 8s. to 7s. (Here the Improvement Commissioners as well as the consumers, have caught the infection of discontent, chiefly in consequence of observing that "there has been a most important reduction lately in many large places"). At Basingstoke, Romsey, Salisbury, Whitehaven, et multis aliis, also, deductions have been made of one, two, and even three shillings at once: at Whitehaven it appeared, that "notwithstanding the reduction that took place some time ago, the concern is a paying one." At Basingstoke, the shareholders were told that the effect of a former reduction, "was a large increase in the consumption, more than adequate to the difference in price."

We meant to have comprehended much more matter in our present report of progress, and especially with regard to the active stir which prevails in various quarters, in consequence chiefly of the government surveyors being now again at work in the collection of evidence for and against such bills as those of "The Bristol and Clifton Gaslight Amendment Act," the "Acts relating to the Southampton Gaslight and Coke Company," and the "Southampton Consumers' Gaslight and Coke Company," the "Worcester New Gas Company's Bill," the "Liverpool Gas Companies' Amalgamation Bill," the "Brentford Gaslight Acts Amendment Bill," &c.; but we must content ourselves in the meantime with the mere enumeration.

We cannot conclude, however, without nominal allusion at least to the warm discussion at the Doncaster gas meeting; to the *resolution* of the pavement commissioners at Winchester, to take the hint we gave, by "advertising for tenders for the lighting of the town," in the face of the gas company, and their enormous charge of 11s. which is thus working out its own cure, as the consumers seem now resolved *not* to be contented with the offer or promise of 9s. as a 'reasonable charge;' also to the progress of the Tottenham and Edmonton Gaslight Company, who have taken possession of the works recently erected, and introduced the use of gas to a large extent among private families; and, finally, to the even still recurring introduction of gas into such new, or rather primitive and antiquated localities, or towns, as Bognor, Cradley, &c. Soon, we hope, shall we have the satisfaction to speak of those *private dwellings* into which it has not yet penetrated, just as we now have occasion to speak of antiquated towns like these; and we are glad to recognise such pioneers in *this* good work as Mr. Rutter, whose *brochure* on the "Advantages of Gaslight in Private Houses," now lies before us, and to which we shall have a more appropriate opportunity again to allude.

THE INSCRIPTIONS ON MONTACUTE HOUSE.

A reader remarks, — "In The Builder for January 22nd, in the article on Montacute House, were given 'A few inscriptions on the building, illustrative of ancient hospitality.' They are—

"'Through this wide opening gate
None come too early, none return too late.'
"'And yours my friend.'

And—

"Welcome the coming
Speed the parting guest," &c.

Reading Pope's poems the other day, in the satire addressed to Mr. Bethel, I noticed nearly similar lines. Now, I think it improbable that such a poet as Pope should steal from a door, or a "north wall," and *probable* that the builders of the said wall and door, took a hint from Pope. If such be the case, how are we to account for the discrepancy in dates? Montacute House "was commenced in 1580, and finished in 1601." My book says Pope was not born till 1688!

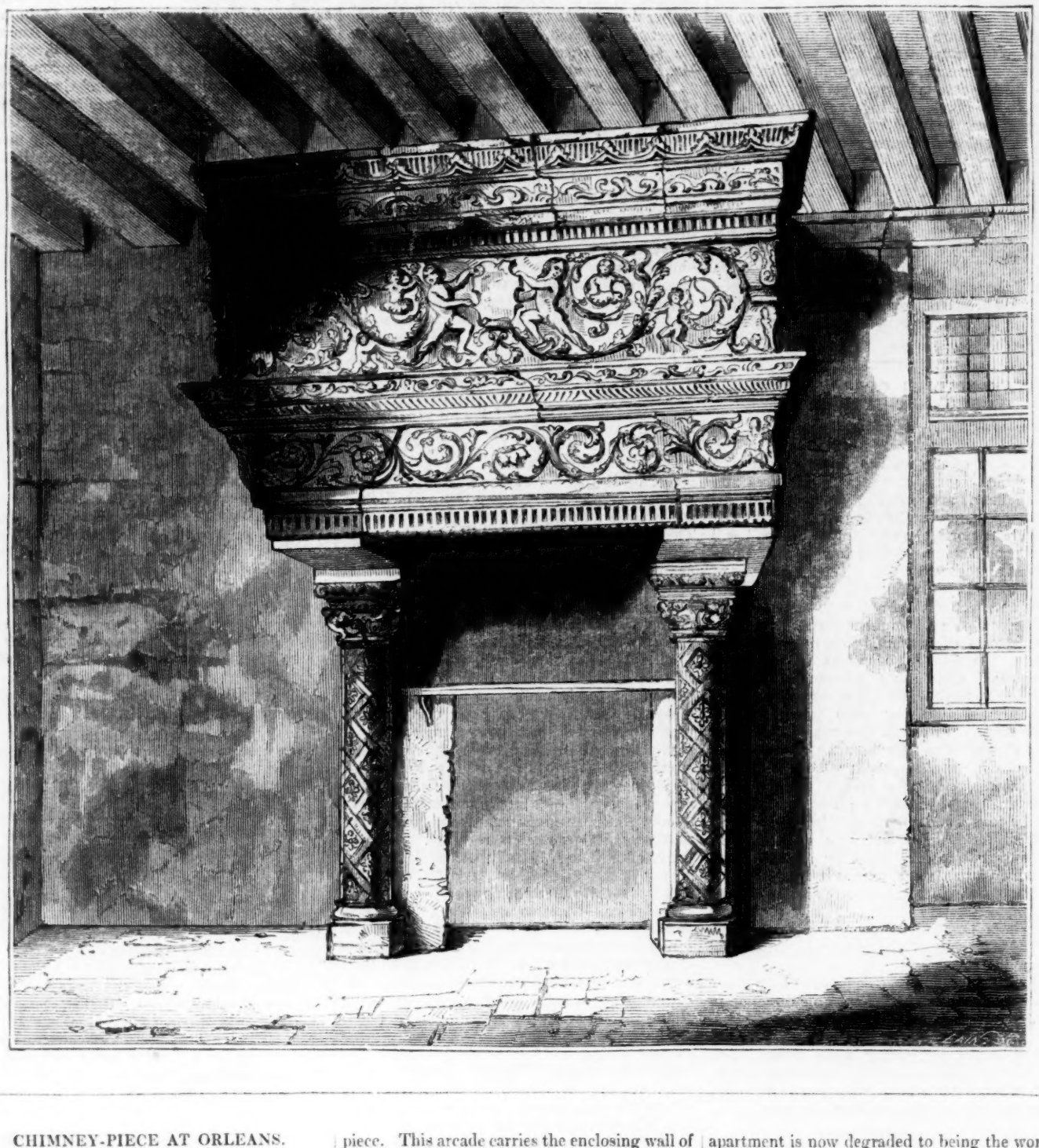
Pope's lines (Imitations of Horace, Book II. satire 2") are,—

"Fortune not much of humbling me can boast;
Though double-tax'd, how little have I lost!
My life's amusements have been just the same,
Before and after standing armies came.
My lands are sold, my father's house is gone;
I'll hire another's: is not that my own,
And yours, my friends, through whose free opening gate
None comes too early, none departs too late;
(For I, who hold sage Homer's rule the best,
Welcome the coming, speed the going guest).
'Pray heaven, it last!' cries Swift, 'as you go on:
I wish to God this house had been your own:
Pity to build without a son or wife:
Why, you'll enjoy it only all your life.'
Well, if the use be mine, can it concern one,
Whether the name belong to Pope or Vernon?"

The inscriptions at Montacute are *incised*, if we remember rightly, and were doubtless copied from Pope after the completion of the building.

It's an ill-wind that blows no one any good.—The disorderly crowds in Trafalgar-square have swept away the hoarding from the base of the Nelson column! It needed a super-natural interposition.

RENAISSANCE CHIMNEY-PIECE AT ORLEANS.



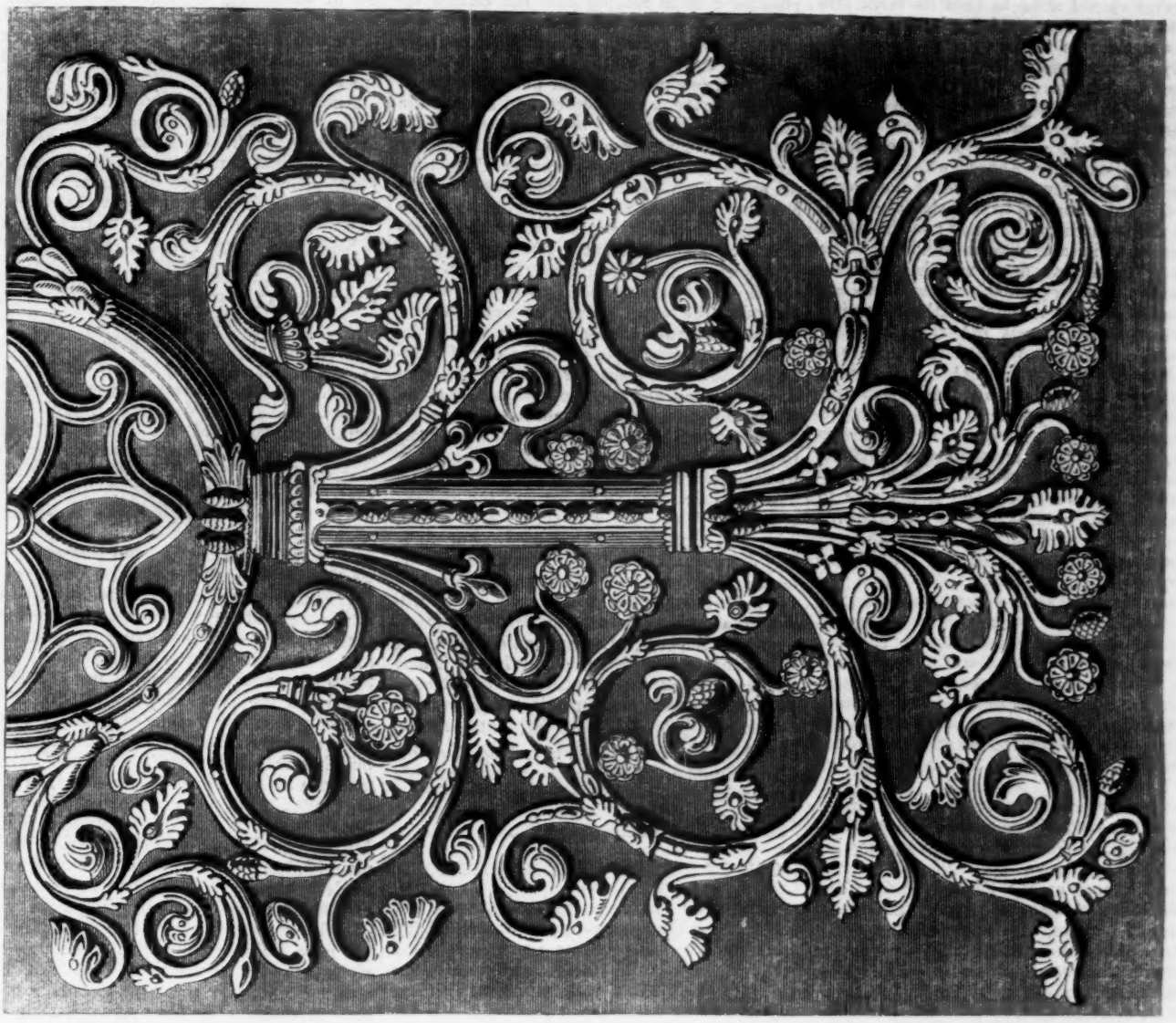
CHIMNEY-PIECE AT ORLEANS.

In a narrow street, near the Market-place, in the very centre of the ancient city of Orleans, called the Rue du Tabourg, and numbered 15, stand the remains of a mansion, which, from the prodigality of its sculptures and carvings, betokens the former abode of some rich and powerful individual. The external front is filled with windows, having very ornate stone dressings, and has a large and small door from the street, extremely remarkable from the high reliefs carved thereon, which completely cover their surfaces. These reliefs are composed of several subjects, in separate compartments, representing events of war, allegorical emblems, processions, and other combinations, in which many figures are employed. Through these doors a passage conducts into an interior court, at the extreme end of which stands an ancient well, still possessing its original ironwork. A few years since the apex of the roofing which covers it was terminated by a massive group of thistles, painted blue, and adorned with gilding. On the left-hand of this court-yard is a gallery supported by three semi-circular arches, based on columns about 8 feet high, the shafts each of a single stone, and having delicately-sculptured capitals of the same design as the engraved chimney-piece. This arcade carries the enclosing wall of the upper part of the house; the ceiling is panelled; and in the centre of each division are emblems in relief of hearts pierced by arrows, flaming torches, a turtle, a sun, a plate laden with pears, in form similar to those known in the Touraine as the *Rousellet;* and lastly, *fleurs-de-lis*. On the side-wall of the colonnade are the remains of two busts, in bas-relief, a third at the end, and in the court-yard a fourth. These are too much mutilated to distinguish the features with accuracy. A leaden water-pipe descends from the parapet of the house to the yard, near the well, and still retains a spiral decoration of brilliant blue, apparently painted in oil, with alternate bands of gilding. The arcade serves as a peristyle to a circular staircase, which ascends from the vaulted cellars through the entire edifice: the dimensions are noble, each step, of a single stone, being 7 feet long: on each landing, carved bosses sustain the vaultings of the ceiling. At the further end of the colonnade, a door on the left leads into the grand saloon, where the chimney-piece stands, of which the annexed engraving is a representation. The saloon is about 45 feet long, by 30 feet in width; all its other ornaments have disappeared, with the exception of a shield bearing three *fleurs-de-lis*, placed as they are at present on the arms of France. This fine apartment is now degraded to being the work-shop of a maker of *sabots;* piles of wood encumber the floor, and the carvers of these rude appendages to the nether limbs of Frenchmen have replaced with their boisterous mirth, the convivialities of the most chivalrous period of ancient France. She curious visitor is reminded of the expected gratuity by an inscription scrawled with charcoal, on the front of the chimney piece, as follows:—"*Messieurs et Dames, qui venez voir la Cheminée, n'oubliez pas la bonne.*"* The ground apartment next the street is formed into a shop, where these wooden shoes are sold to the plebeian inhabitants of the city.

It has been said that this house was built and inhabited by the father of Marie Torichet, others have pretended that it was erected by the Cardinal Briconnet, but according to the tradition handed down by those who have possessed and resided in it, it is believed to have been built, and decorated by Charles VII. The elegance of the construction indicates that it must have been destined for some exalted personage living before 1470. The lavish and delicate sculptures, the ornaments with the *fleurs-de-lis*, and the fruits characterising the produce of the Touraine, all concur in its

* The frieze is much broken, but is restored in our view, which is engraved from a sketch by Mr. Mogford.

IRON-WORK FROM NOTRE DAME, PARIS.



royal origin, and its being adorned expressly for Agnes Sorel, who was born in this province. Her *goût* for the fruits of her native province is displayed by the dish containing the pears, being placed in the most prominent position. This opinion is strengthened by a close examination of the mutilated crests, where a great resemblance is seen in the female head to the one of Agnes Sorel, which is sculptured on her monument in the Abbey at Loches, and in the male head, with the features of Charles VII. as existing on the medals of his reign.

It is much to be regretted that this beautiful relic of the "Renaissance" should be so neglected. Orleans contains several remarkable mansions of this period and style, of which may be named the house built by Francis I. for the Duchess d'Etampes in the Rue de la Recouvrance, and the house of Diana of Poitiers in the Rue des Albanais.

A few doors from the house above described, in the same Rue du Tabourg, is the Maison de l'Annonciade. This edifice contains a small building in the garden, consisting of two rooms, said to have been occupied by the famous Joan of Arc. They are very ornate internally, but were certainly built at least a century after the heroine's exploits.

Lord Northampton's First Soiree, given on the 4th inst., was, as usual, very numerously attended. The generally received belief that the kind and accomplished Marquis will not again be put in nomination for the presidency of the Royal Society, is much regretted by some of the best friends of the society.

ORNAMENTAL IRONWORK FROM NOTRE DAME, PARIS.

The gates or doors on each side of the great entrance to the cathedral of Notre Dame at Paris are adorned with some very elaborate ironwork, the skill shewn in the execution of which, even in this day, is quite surprising, and fully illustrates the mastery which the ancient armourers and workers had obtained over this material. Our plate shews only a small portion of the least decorated part of this ironwork; the other parts are ornamented with birds, animals, grapes, flowers, and foliage. It has been a question as to the date of the execution of this ironwork. The foreign antiquary, Willemin, affirmed it was done so early as the end of the twelfth or the commencement of the 13th century, and this in direct opposition to the statement given by another French writer on antiquities, Sauval, whose work appeared in 1660, and who, in his account of this ironwork, states positively it had been executed about 120 years previously. The style of the ornament certainly leads to the conclusion that the latter is more correct, and as his account is curious, we shall give it in full.

"The ironwork of the two doors has at length been admirably well wrought by Biscornette, the sculptor; the birds and ornaments are wonderful; they are wrought in iron; the manner of working died with Biscornette. This artist worked in iron with an industry almost incredible; he made it simple, tractable, and gave to it all the moulds and shapes that he wished, with a softness and grace which surprise and delight all the blacksmiths. Gayart, the smith to the king (in endeavouring to discover a secret so wonderful), broke some parts of the iron off these doors, and afterwards declared that after all the trouble he had given himself in experimenting upon it, he had become no wiser, and at the same time added, that he had great trouble in using the little iron that he had broken off.

The doors have been made for 120 years, and are admired by every smith,—the foliage is admired for its beauty, and the execution of the work is wonderful,—those in the trade have not yet been able to discover precisely the manner of working; for some think it is of wrought iron, which they call bar iron; others say that it is cast and filed; others pretend that it is beat or hammered, the most clever of our smiths contend that the iron is cast and without solder: one thing is certain, the secret was lost at the death of Biscornette, who was so afraid that they would rob him of it, that no one, as they say, ever saw him work."

Without a close examination of the iron work in question, it might be difficult to determine its exact mode of construction, but from some ancient ironwork of similar description in the possession of the present writer, he would suppose that it had first been cut or sawn out of thin iron-plate, and then beat or punched out in the back into the required pattern. R.

Lord Morpeth's Speech on bringing in his Bill for promoting the public health (February 10th), is now published in the shape of a pamphlet,* and may be usefully circulated by those who are anxious to aid the sanitary movement. The Bill, it is to be regretted, makes but slow progress through the House. It will probably go into committee on Monday next.

* Ridgway, Piccadilly.

METROPOLITAN IMPROVEMENTS.

SIR,—As an Englishman, I take a pride in London and its public buildings and monuments; and though we cannot expect an Augustus should arise to turn its brick into marble, yet we may perhaps be induced to exert ourselves so far as to remove some unsightly appearances, which are a reproach in the eyes of foreigners. With this hope, I beg permission to bring to notice two such offences against taste in the metropolis.

The first is the ugly stump in the central part of Westminster Abbey, which was intended to bear a tower, but which has never been finished according to the original design. Thus the monarchs of England and the Indies are crowned in a mutilated building! The ashes of the mighty dead, who have exalted this nation by their genius, wisdom, heroism, or powers, are not thought worthy of having a finished shrine to rest in! The house of God must hang down its head in presence of the Houses of Parliament! And whilst Cologne,—a mere village in comparison with London,—is doing justice to the noble design of its ancestors, the foreigner, as he passes along, points to the truncated tower of Westminster Abbey, and says:—"Behold a nation which began to build, and is not able to finish," though a mere trifle is required for the purpose in proportion to our wealth, and compared with the actual demand for Cologne Cathedral.

Now, Sir, what is to prevent us from raising a tower, with a spire of light perforated architecture, upon the central base provided for that purpose? The foundation is sufficient, as those at the western end proved sufficient for Wren's superstructures; and if not, could be made so. And why should not the unorthodox disfigurations of that architect be retrieved and replaced by proper restorations?

The next reproach, which every one proud of his native land wishes to see removed from its chief city, is the want of quays along the bank of the Thames, on each side, in the manner of those on the Seine at Paris. The Thames is nothing more than the *cloaca maxima* of London, into which all the minor *cloacæ* disgorge their filth through the various vomitories that range along its banks; it is, therefore, like sailing up the common sewers when we enter London by the river; and foreigners may well be pardoned if they ask with a smile, "Are we proceeding to the Temple of Cloacina?" when they find themselves inevitably committed to the endurance of its offensive peculiarities. This subject was sometime ago taken up with spirit, but appears now to have subsided.

I would suggest, that instead of the face of the quay or pier towards the river being composed of solid masonry, rising like a wall out of the water, it should consist of a row of arches running along each bank, and forming a façade towards the Thames, like that of a first-rate viaduct in a railway. The advantages would be numerous, and amongst others much space might be gained; for the platform of the quay resting upon groinings and arches, which admit the course of the stream uninterruptedly beneath them, the river would not be compressed within narrower limits than before, nor the power of its tide increased; for the arches might be pushed forward even to low-water mark without injury. By this, also, all the unsightly and unsavoury nuisances which disfigure the banks would be covered over. Staircases also might be contrived within the arches, so as to keep the façade unbroken, and landing piers at the bridges; and, while the effect would be beyond what any other city can show, and worthy of London, the stream of traffic which chokes the parallel streets would be divided, and the delay of transit obviated.

Available space for a double line railway might he gained by such a pier or quay: but it will occur, "What is to be done at the crossings?"—for such a railway must cross the heads of bridges, &c. If no other way should occur, why not raise a second tier of arches carrying the railway, and resting upon the quay, so conveying the railway over the heads of the passing pedestrians, carts, &c. at the crossings,—thus imitating a Roman aqueduct of two tiers or stories of arches, of which the lowest sustains the quay, the uppermost bears the railway. Thus we should have a row of stout piers rising (suppose) from low-water mark, and from them arches springing, surmounted by a parapet, and bearing a platform of stone, which is "*the quay*." Upon these arches but perhaps a little retiring (and not carried up flush with the lower piers and parapet, but receding so as to leave a roadway or pathway along by the side of the parapet), you are to suppose a row of columns or piers rising high enough for the desired object, and bearing the railway from one end of the metropolis to the other, at least from Westminster Bridge as far east as practicable or desirable. The tunnel might form part of the plan, as affording a passage across the river at one end, and the Charing Cross Bridge might supply the foundations of another. But I am forgetting my description. You have, then, first the quay raised on a row of arches at low-water mark; secondly, the railway raised on arches resting on the quay, and passing over the heads of the people at the crossings; thirdly, a row of warehouses, in a good Italian or Roman style, built upon the quay, and rising up behind and above the railway two, three, or more stories, forming an embankment (as it were) for the railway to rest against on that side, and having street buttresses, corresponding to the pillars on the Thames side, for the support of the railway platform. The quay will thus be an arcade, with the exception of a clear roadway or footway between the pillars and the parapet of the quay; and this arcade will have openings into the warehouses, while the railway above will have the same.

As to "the cost," London can do any thing that *money* can command; and though it may appear much, I am persuaded it would even pay as a speculation, such is the amount of traffic.

PALLADIO.

*** Similar suggestions have long been before the public. We insert our correspondent's letter with the view of keeping such a project alive.

USE OF CEMENT IN CONSTRUCTION.

SIR,—The late melancholy occurrence and loss of life at the Euston-square Station, arising from the nonsetting of the cement used, has induced me to read, with much attention, the evidence reported in your paper. I perceive Mr. Hardwick's opinion to be, "that had the work been proceeded with in a dry season, in all probability the accident would not have occurred, and that it arose from the nonin-duration of the cement, owing to the excessive wet weather." I entirely differ with him on that point, knowing, as I do from experience, that good cement is never so much in its element as when used in damp weather; and I am prepared to support and prove the correctness of my opinion, either to Mr. Hardwick or any other architect or builder, by joining together with good Portland cement and sand, a given number of wet bricks, and keeping them moist for ten days or longer, and establishing at the end of the time that the bricks cannot, by any fair means, be disconnected at the joints from the cement; on the contrary, the bricks will break, whilst the cement will remain hard and firm in the joints. I observe one of the jurymen states as his opinion, "that had the work been done in April or May, the cement might have set in a few days, but at this season of the year it would not set in several weeks." This gentleman is evidently unacquainted with the nature and power of the material. The truth is, the failure of the works at Euston-square was entirely owing to the bad quality of the cement used; the columns at the station having been set in cement, would not, had it been good, have broken as described in the evidence, nor until coming in contact with the ground, and then only in the three or four pieces, arising solely from the breaking of the bricks. I differ also with Mr. Harwick in opinion, "that good cement should at all times be used immediately after it is prepared, and that by being left long, its adhesiveness is destroyed, *and it becomes crumbly*." The fact is, good cement never becomes crumbly. I have kept cement for four or five years, and afterwards, on its being exposed to the atmosphere, it has set twice as hard as when fresh from the manufactory. Having been practically connected with cement works and building, and made numberless experiments with good Portland cement and brick, from my childhood, I assert, without fear of contradiction, that a cube foot of sound brick, set in good cement for ten days, is capable of sustaining a weight of 50 tons. It matters little which way the bricks are laid, if the material be good; provided the work be well walled and grouted, the structure will be one solid mass.

Apologising for this lengthened intrusion on your valuable columns, induced by nothing but a desire to serve the public, and not to prejudice any individual cement manufacturer, being, as I am, entirely ignorant by whom the cement was supplied for the building at the station,

I am, &c., WM. ASPDIN.

Northfleet, Kent, Feb. 11, 1848.

PROVINCIAL NEWS.—BUILDINGS AND RAILWAYS.

THE second graving dock at Southampton is completed. —— The plans of the new workhouse at Leicester have been approved of by the Poor Law Board.——The foundation stone of St. Thomas's Church, Coventry was laid on Thursday week; and that of the new church in All Saints district, Liverpool, on Monday week. The latter will be in the pointed style, with a spire and plain exterior: estimated cost, 4,000*l.*; Mr. Arthur Holme, architect; and Messrs. Duckworth, Nuttall, and Burroughs, builders.—— St. Simon's parish church, Liverpool, was to be consecrated the end of last week or beginning of this.——The clearing of cellar occupancies at Liverpool is still going on; about 3,000 have now been vacated, but 11,000 still remain in the occupancy of 27,000 persons. ——The foundation stone of a new Wesleyan chapel has been laid at Cleethorpes.——The building called St. John's Sessional Schools, at South Shields, is nearly completed, at a cost of 1,000*l.*, from working plans prepared by Mr. Thomas Oliver, of Newcastle; builder, Mr. George Young, South Shields. It is a plain edifice, with doors and windows in the modern Gothic style. The roof-interior is exposed in stained and varnished wood work. ——An operative chemist in Louth is said to have invented a self-illuminative rail-signal, to be attached to the rail by a strip of lead, and shew by the colour of the light produced while the engine passes over it the nature of the danger ahead. A contemporary also intimates the invention, at Louth, of a fixed machine which shuts off the steam of the engine in passing, whilst it blows the alarum-whistle, and might even be made to apply the break.——In seven appeals to juries in Lincolnshire, the amount claimed by seven landowners, from the Great Northern, was 27,290*l.*, the sum offered was 12,076*l.*, and the amount awarded was 11,850*l.*——More bridges have been giving way before the ordinary test of winter's powers of wind and rain or frost and thaw. One recently constructed at Earley, on the Reading and Reigate line, succumbed on Friday week, ostensibly to a train of earth-waggons, but attributively to a heavy gale of wind and rain during the previous day. Another has also fallen at Hammerwick, near Lichfield, on the South Staffordshire line, now in course of construction.——The masons employed on the Tweed bridge struck work on Monday fortnight; and 160 of them, besides 50 labourers, are still idle. In November the wages had been reduced from 27*s.* to 24*s.* and 21*s.*, in consequence of the slackening in the demand for workmen and the shortening of the days; but now that the working hours are extended, the masons have demanded a return to 24*s.*, which the state of the demand for workmen does not appear to have warranted their employers in acceding to.——The railroad bridge between Hartford and Springfield, U.S., was rebuilt in *one week*, though 200 feet long. Yankee enterprise that! says the *American Sun*. Yankee enterprise truly, which no one, we hope, will seek to excel till the Hartford and Springfield bridge way is *again* open, as it no doubt shortly will be, to a repetition of the same smart experiment, and then our Yankee enterprisers, having no one else desirous to excel them in their own peculiar line, will no doubt feel impelled, by their own indomitable go-a-head-strong impulses, even to excel themselves.

MITCHELL'S SCREW PILE.

INSTITUTION OF CIVIL ENGINEERS.

On the 22nd ult., the president in the chair, the paper read was by Mr. A. Mitchell, "On Submarine Foundations; particularly the Screw Pile and Moorings." Considering that the entire subjects of the various sorts of piling, of solid stone foundations, of cofferdams, of masses of concrete, and the numerous modes adopted by ingenious men for overcoming local difficulties, would occupy too much time, and scarcely possess novelty, the author restricted himself almost entirely to the description of the works executed by him with the screw pile, as that had been chiefly employed for supporting structures on loose sand, or mud banks wholly or partially covered by the sea, where it had been previously considered very hazardous, if not impracticable, to erect any permanent edifice.

The origin of the screw pile was the screw mooring, which was designed for the purpose of obtaining, for an especial purpose, a greater holding power than was possessed by either the ordinary pile, or any of the usual mooring anchors or blocks, of however large dimensions. It was proved by experiment, that if a screw, with a broad spiral flange, were fixed upon a spindle, and forcibly propelled by rotary motion to a certain depth into the ground, an enormous force would be required to abstract it by direct tension, and that the power employed must be sufficient to drag up a mass of the form of the frustrum of a cone reversed, the base being at the surface of the ground, and the section of the apex being equal to the diameter of the screw. The extent of the resisting mass must of course depend upon the natural tenacity of the soil; even in this reasoning it must be evident that a vertical force was calculated upon, but as practically that seldom or ever occurred, the angle of tension and the curve of the buoy cable again gave the moorings greater power. This was found to be correct in practice, and the applications of these moorings became very extensive. An arrangement was made with the port of Newcastle-on-Tyne, by which, for the sum of 2,500*l.*, the right of fixing the moorings in the Tyne was given, and Mr. Brookes, the engineer, showed that last year, whilst in the neighbouring port damage was done to the shipping to the extent of nearly 30,000*l.*, no injury was sustained in the Tyne, entirely owing to the sound holding of Mitchell's screw pile moorings.

It naturally occurred to Mr. Mitchell that the same means of resistance to downward pressure might be used, and he proposed to apply it for the foundations of lighthouses, beacons, and other structures, which, for maritime purposes, it might be desirable to place upon sand and mud banks where hitherto it had been considered impracticable to place any permanent edifices. In the year 1838 a plan for a structure of this nature for a lighthouse on the Maplin sand, at the mouth of the Thames, was laid before the corporation of the Trinity-house, supported by the opinion of Mr. James Walker, their engineer. The nine iron piles, 5 inches in diameter, with screws 4 feet in diameter, were accordingly driven 22 feet deep into the mud, and, with proper precaution, they were allowed to stand for two years before any edifice was placed upon them. The lighthouse was subsequently constructed, and, as was testified by Mr. Walker, had stood perfectly until the present time. Pending the prolation, it was determined to erect a lighthouse to point out the entrance to the harbour of Fleetwood-on-Wyre; and under the advice of Captain Denham, R.N., the screw piles were adopted. The spot fixed on was the point of a bank of loose sand, about two miles from the shore. Screw iron piles, with screws of 3 feet in diameter, were forced about 16 feet into the bank, and upon them timber supports, 48 feet in vertical height, were fixed to carry the house and lanthern. This structure was completed in six months, and it was said had never required any repairs to the present time.

A project was started by the Earl of Courtown in the year 1847, for adding to the length of the pier at the harbour of Courtown, on the coast of Wexford, which had proved an entire failure, from the channel between the solid pier being continually choked up with sand. Iron piles, with screws of 2 feet diameter, to be driven from 11 feet to 15 feet into the sand, and blue clay, were decided to be used in order to form an open jetty, through which the sand could be washed by the current; and the platform could be used for loading and discharging the shipping. The surface was so heavy on the coast that the usual barges, or floating rafts, could not be used for putting the piles down, so a plan was designed by Messrs. Mitchell for projecting a stage forward from the solid part, rigging a large grooved wheel upon the top of the pile, passing an endless rope band around it, and round a pulley fixed 150 feet back; and then, by a number of men hauling upon the bank, a rotary motion was communicated to the pile, which screwed it down very fast. By these means, one bay of the pier, 17 feet long, was finished daily, even in very rough weather. The entire length of the jetty was 260 feet, its breadth 18 feet, with a cross-head 54 feet long, with landing-stages at each end, and two lines of railway throughout. The entire cost of this extension was 4,150*l.*, or about 47*l.* 10s. per lineal yard.

At a meeting on the 29th ult., various communications were received on the same subject, and were discussed at some length. Afterwards a paper was read, entitled "Remarks on the Formation of Entrances to Docks situated upon a Tide-way;" by Mr. J. B. Redman. After illustrating the subject by the example of the position and direction of all the principal dock entrances on the borders of the Thames in the port of London—shewing that the variations in the opinions and practices of engineers had been very great—it detailed the ordinary methods of docking and undocking ships, and the precautions to be taken in constructing entrances which should be best adapted for facilitating these operations; and although it was difficult to lay down any positive rules upon the subject, as the engineer must in almost every case be guided by local circumstances, in all ordinary cases the following general rules were recommended:—For graving docks, an angle of about 45 degrees, pointing up the stream; for wet docks, an angle of about 60 degrees, in the same direction; and a right angle with the stream for building ships. These, it was believed, would be generally found the most available.

THE PHILOSOPHY OF LABOUR.

In the week before last Elihu Burritt, the remarkable blacksmith of America, delivered a powerful address on this subject at Hull. After tracing the progress of man from the exercise of what he termed his primary faculties,—his hands and feet,—the speaker said:—The human mind has given to the world such embodiments of thought, that thousands have half worshipped the divinity that stirred within them, and even called the artist divine. It matters not whether he incarnated these godlike thoughts in canvas or marble, he breathed into the immortal image a living soul, a speaking mind, which will for ever remain behind to commune with the successive generations of men, when his name shall have perished. The Apollo Belvidere and Venus de Medicis are not petrifactions of thought, not posthumous images of a dead mind. No: their cold marble lips for centuries have uttered a voiceless language that has awed buried millions into reverence: they will hold the same sublime converse with millions yet unborn. Are these works divine? Let me point you to others of higher antiquity, of more direct divinity, a speaking statuary that conversed with Noah in the Ark, and all his descendants. Look at that axe, hammer, hoe, and spade. In their iron lips is a living speech, which has been audible to all ages and generations of men. They are things inspired with more divinity than all the marble statuary in the world: yes, and with humanity too, for they have worked for man as well as talked. Before sculpture had hollowed out a mortar to grind his corn, when the earth was one vast uncultivated wilderness, they went out and laboured with him in the field and forest, in the ditch and in the mountain: they helped him to get his food and feed his children, and make them a cover from the storm. They are the fathers of all statuary, painting, and architecture; and invested with just the more divine dignity than they, as they possess the more faculty to do for man: therefore, of all human works, those he has endowed with a kind of creative capacity, or a faculty for labouring for his comfort, are most entitled to the quality of divinity and the veneration of mankind: for they are not only his doing, but his faculty to do what he could not do before. Let us look in upon a man while engaged in the very act of adding to his natural strength these gigantic faculties. See him yonder bending over his stone mortar, and pounding, and thumping, and sweating to pulverise his flinty grain into a more esculent form. He stops and looks a moment into the precipitous torrent, thundering down its rocky channel. There, a thought has struck him. He begins to whistle; he whittles some timber, for he learned to whittle soon after he learned to breathe. He gears together, some horizontally, and others perpendicularly, a score of little wooden wheels. He sets them agoing, and claps his hands in triumph to see what they would do if a thousand times larger. Look at him again. How proudly he stands with folded arms, looking at the huge things that are working for him. He has made that wild raging torrent as tame as a horse. He has taught it to walk backward and forward; he has given it hands, and put the crank of his big wheel into them, and made it turn his ponderous grindstone! What a taskmaster! Look at him again. He is standing on the ocean beach watching the crested billows as they move in martial squadrons over the deep. He has conceived or heard that richer productions, more delicious fruits and flowers may be found on yonder invisible shore. In an instant his mind sympathises with the yearnings of his physical nature. See! there is a new thought in his eye. He remembers how he first saddled the horse; he now bits and saddles the mountain wave. Not satisfied with subduing this proud element, he breaks another into his service. Remembering his mill-dam, he constructs a floating dam of canvas in the air, to harness the wings to his ocean waggon. Thus, with his water-horse and air-horse harnessed in tandem, he drives across the wilderness of waters with a team that would make old Neptune hide his diminished head for envy, and sink his clumsy chariot beneath the waves. See, now he wants something else; his appetite for something better than he has grows upon what it feeds upon. The fact is, he has plodded about in his one-horse waggon, until he is disgusted with his poor capacity of locomotion. The wings of Mercury, modern eagles, and paper kites, are all too impracticable models. He settles down upon the persuasion that he can make a great iron horse, with bones of steel, and muscles of brass, that will run against time with Mercury, or any other winged messenger of Jove,—the daring man. He brings out his huge leviathan. Sets it upon the track. How the giant creature struts forth from his stable panting to be gone. His great heart is a furnace of glowing coals; his blood is boiling in his veins; the strength of a thousand horses is nerving his iron sinews. But his master reins him in with one finger, till the whole of some western village, men, women, children, and half their home and cattle, sheep, poultry, wheat, cheese, and potatoes, have been stowed away in that long train of waggons he has harnessed to his foaming steam-horse. And now he shouts interrogatively—"All right?" and applying a burning goad to the huge creature, away it thunders over the iron road, breathing forth fire and smoke in its indignant haste to outstrip the wind. To ameliorate our physical condition has been the inspiring object of every intellectual attainment. It has led to the discovery of every principle of natural philosophy and science; it has inspired every conception of taste, prompted every act of patriotism and Christian philanthropy. It was not to indulge a few mere intellectual abstractions that the ancient shepherds and sailors clambered up into the blue heavens and constellated the stars; they wanted them for guide-boards to guide them by night over the plains of the east and the unchartered waters of the ocean. If Phidias and Praxiteles were only bent on a mere diversion of the imagination, neither of them needed to have touched a chisel. The man who created the Apollo Belvidere looked into the mountain side, and saw the silver-

bowed deity invested in all his godlike attributes in the unquarried marble. But he could not bear to see him hampered there in a shroud before his mind's eye. He seized his chisel, and with indignant strokes, he tore away the cerementa1 marble, and let out the god before his body's eye, to be worshipped by millions, who, if they dared, might even touch his marble flesh. All the beautiful orders of architecture and creations of the pencil, all the conceptions of the beautiful in nature and art, and humanity, are inventions extorted, as it were, from the mind, to extend and increase the pleasures of sense.

INTERNAL ARRANGEMENT OF PARISH CHURCHES.

AT a recent meeting of the Northampton Architectural Society (Lord Northampton in the chair), after a lecture on "Glass-painting," the Rev. Thomas James read a paper on the "Internal Arrangement and Fitting-up of Churches."

Starting with the principle that all plans for church fittings should keep in view the fact that our churches are houses of prayer, Mr. James proceeded to state, that all the sittings should be alike, or, if there were any distinction, the advantage should be given to those who were most peculiarly the objects of the Church's care. There should be no secrecy, and, therefore, no doors; no reclining backs to tempt people to lounge. The seats should be all open, low, straight-backed, all alike; with kneeling places facing the east. The seats should be sufficiently broad, because, although the luxuries of the drawing-room were inappropriate in a church, yet a state of absolute discomfort was no help to devotion. The old oak seats were inconveniently narrow, and the rail above pressed uncomfortably against the back. A book-board is advisable, not so much for the book as for the arms to rest on when kneeling. Whether there should be a continuous kneeling-board or a hassock was disputed. The seats, however, should be closed beneath. Mr. James then proceeded to describe the mode in which seats should be arranged in different descriptions of churches. He concluded this section of his subject by observing, that from twenty to fifty per cent. additional accommodation might be obtained by having open seats. The pulpit should be on the north side of the chancel arch, and of a half-polygon shape, and low. Mr. James advocated the use of the lectern, of which the most beautiful form is the eagle. He recalled to the recollection of some of his hearers the fine one in the church at Oundle. The font should be the first object to catch the eye on entering; it should not stand in the centre, as is frequently the case, but against one of the western pillars. If there is room there should be at least three steps, and a projecting stone for the priest. A pavement of warm-coloured sandstone, of irregular sizes, he thought better than the white flags or the black and white squares, which have too domestic an appearance. The best and cheapest paving is of encaustic tiles, which should be laid diagonally. The pavement of the chancel should be richer than that of the rest of the church, and the arms of the benefactors would form appropriate ornaments. All shams are to be avoided. All canons and texts should be written intelligibly. He need scarcely say a word against galleries. Public opinion had condemned them; they were generally the refuge of the petty aristocracy in towns, and of the disorderly in villages. Nor was the organ an excuse for having one at the west end. The best position for the organ was on the ground towards the east, at the end of the aisle; being brought more into the body of the church, it would conduce to congregational singing. Some mistakes have been committed in throwing open the chancel-arch too much. The chancel itself, where there is sufficient room elsewhere, should be without any seats for the congregation. Where rood-screens and side-screens exist, they should be repaired and retained, but never introduced. They should be considered in an architectural and archæological, not in an ecclesiological view. The old sedilia, where they exist, should be restored to use, and where they do not, they should be introduced. Every thing in the shape of altar-chairs is objectionable, as partaking too much of a domestic character. Mr. James concluded by observing that his object was to stem the tide of mischief which had set in with respect to church alterations. He admitted that the Architectural Society had done good, but it was almost a question whether it had not done an equal amount of harm, in inducing repairs by persons who understood nothing of the right principles upon which they should be conducted. Many churches, he found, had been tampered with, and left in a worse condition than they were before—worse, because the great outlay and the substantial character of the work left little chance that it would ever be undone. He would rather see churches left untouched than restored half-right, half-wrong, as was the too prevalent fashion.

CONDITION OF ARCHITECTURAL STUDENTS AND DRAUGHTSMEN.

SIR,—All who have studied architecture must know that the student who is about to enter the profession has a work of great difficulty before him. He is taken rough from school, and placed in the office of an architect, who receives him for a term of four or five years at a high premium; his occupation for the period of his articles is to copy drawings, and perhaps occasionally make out fair drawings for competitions, &c., but in nine cases out of ten this is the only instruction he receives during the period. We know, from experience, that an architect in full practice has little time to spare to instruct his pupil, or to point out to him the course of study he should go through, or the books he should peruse (and under such circumstances ought not to take pupils into his office), so the only information which he obtains is gleaned from the head clerks of the office, and is usually quite insufficient to compensate him for the time lost and the money paid, or to fit him for such a profession as architecture. Is there no way to remedy such an error? Will the profession allow such an evil to exist without aiding, as far as they can, to remove it? Something must be done to improve the system. Look to him when the student is out of his time, a young architect,—what are his prospects? He is ill-fitted to ask for pay, being able to do but little, and finds a difficulty in procuring an engagement. Sooner than lose what little knowledge he possesses, he enters an office as an improver, not thinking of the injury he is inflicting on his more advanced brethren in keeping them from being employed at a salary.

The young man who has been fortunate and industrious, and has spent his spare hours in study and reflection, will find the pecuniary recompense from an office comparatively nothing when he considers the money he has spent in learning his art, and can only trust to exertion and a lucky star to lead him to fame. The student must push on and waste no time, but something should be done to make his course easier and more profitable. Before closing these remarks, I would suggest the establishment of a society for the relief of those who are out of employment. Many of the profession and the younger branch would be glad to render their aid in supporting such an institution, particularly those who are in office, as they themselves at a future day might require the aid of the society's funds. We find there is a society for merchant clerks, as also the provident law clerks, and why should we feel too proud to establish the architects' clerk society? J.

*** What has become of the memorial forwarded to the institute some time ago, begging the council to assist in the establishment of an architects' benevolent fund?

ARMY AND NAVY CLUB-HOUSE, PALL MALL.—The new building, from the design of Messrs. Parnell and Smith, and of which we gave an engraving some time since,* is about to be commenced. The following is a list of the tenders delivered for the carcass:—

Lee	£21,890
Armstrong and Smith	21,355
Lock and Nesham	21,200
W. Cubitt	20,750
Baker	20,450
Trego	19,656

* See p. 519, Vol. V.

Correspondence.

SEWERS IN BERMONDSEY.

SIR,—I see in my last number of THE BUILDER, that Mr. Drew says he is not aware of any complaint having been made of the filthy state of the ditches at the back of the nunnery at Dockhead, Bermondsey. I assure you there has been a continued outcry for years for a sewer in that district, and concerning the filthy state of the streets thereabouts, and Mr. Drew must know that the Commissioners, when applied to, have always said they had no funds for that purpose. Rates and taxes have been paid for these streets for at least sixteen years, during which time they have been in the same filthy state as at present; and the ratepayers think that they are not dealt justly by, especially when they hear that the Commissioners are about to pay their clerk 1,900*l.* for compensation for a part only of his office, which sum, if properly applied, would be sufficient to clear the mud from every poor man's house in Bermondsey. Hoping that you will find room for this in your journal, that this statement of facts may follow Mr. Drew's assertion, so that the inhabitants may not be condemned as well as neglected.—I am, Sir, &c.,

Bermondsey. JOHN LUGG.

REVIVAL OF MONUMENTAL BRASSES.

SIR,—We were somewhat surprised to see in THE BUILDER, of Saturday, the 4th inst., an account of the revival of ornamental brasses, by Mr. Archer, written in a manner which would lead to an inference that he alone had conduced to such an end. Now this is far from being the case, for if the merit of their re-introduction belong to any, it must certainly be ascribed to Messrs. Hardman, of Birmingham (under the direction of Mr. Pugin) by whom a great number have been executed. And that *we* may claim some share in the matter will be allowed from the fact of our having executed nearly forty brasses, amongst which are many effigies, with canopies, &c. Mr. Archer's first brass at Caius College cannot be called a revival, as it is scarcely more than a large etching, and not in the spirit of the "olden time."—We are, Sir, &c. J. G. and L. A. B. WALLER.

20, Charles-street, Middlesex Hospital,
March 9, 1848.

Miscellanea.

AN EXHIBITION OF BOOK-FINISHERS' DESIGNS was held by a committee of the London Book-finishers' Association, on Monday evening, at the Plough Tavern, Museum-street, where there was a good display of rubbings from ancient and modern specimens of the art, and of new designs, both original or modern, and also imitative of those elaborate decorations with which the learned monks of old delighted, themselves, to illuminate and adorn their biblical treasures. Where variety and taste, as well as ingenuity, were so generally displayed, it might be invidious to distinguish any one of the modern specimens which most struck our fancy; but amongst the ancient, there is less occasion for reserve, and we may therefore remark, that the one specimen amongst all of these which we most admired, was a rubbing from the boards of an Irish book nearly eight hundred years older than any other in the room. In this preference we believe we shall be borne out by many of the intelligent practical men present, as well as in our next selection of a geometrical design, with a quiver in the centre, from amongst the 'Diana' patterns. A member of the committee delivered an able and interesting address on the history, the capabilities, and the prospects of their art, as a high and elaborate branch of decorative art in general, and in course of his observations on the *esprit du corps*, the taste, and the pride, which animate some, and ought to animate all, of his fellow-workmen in the execution of their more elaborate and original designs, he took occasion to refer them appositely to some remarks in THE BUILDER, on the retrogradation of certain other arts, and on its causes. This exhibition, as the first of its order, promises fairly for the future advancement of a tasteful branch of decorative art.

JARDIN D'HIVER IN SCOTLAND.—The Caledonian Horticultural Society propose to construct a winter garden at Inverleith, somewhat on the plan of that in Paris (?). A plan, designed by the superintendents, has been approved of generally by the garden committee. It forms a quadrangular structure, and is so contrived that one side only of the quadrangle may be erected at first, 140 feet in length by 35 in breadth. The heating is to be accomplished by means of hot water.

THE NEW WHITE PAINT, of which a temporary mystery was lately made, and the basis of which we anticipated to be either antimony or bismuth (the latter a metal proposed by Regnault to be classed with antimony itself), formed the subject of a paper read by Mr. Forrest, the discoverer, at the Liverpool Polytechnic Society, on Monday, last week, when he announced his intention to make a present of it to the public, intimating, at the same time, that it consisted of white oxide of antimony (argentine flowers, as it used to be called by the old chemists), and that it had many advantages as an excellent body paint, superior to white lead and much cheaper, inasmuch as antimony might be obtained in abundance for about 12*l.* a ton, while lead costs 24*l.* 10s. He also pointed out its greater permanency of colour, and its capability of being spread over a much larger surface than an equal weight of white lead. Indeed, it is not only lighter, but may be made more subtle; and it was its superiority in these and other respects that led us to regard it as a likely substitute for lead. It is rather singular, too, that the old chemists called antimony *their* lead, maintaining that, in some of its properties, it bore a near affinity to lead.

POLYGONAL DECORATIONS. — GREEK VASES.—During one of the recent discussions at the Society of Arts, on the construction of Greek vases and the production of beautiful forms, already mentioned by us, Mr. Russell, the secretary, observed,—It is continually alleged as a fault of art in our day, that instead of boldly creating forms and trusting to our own minds, and carrying out those feelings according to what we consider the enlightened principles which we have struck out for ourselves, we are contented to take for granted that the ancients were artists truly unapproachable, and as such we can never hope to equal, much less to excel, and therefore the best thing that we can do is to abandon altogether originality, and give ourselves up to the study and copying of antique forms. He then pointed out the effect of a design upon the mind and senses in the case of Polygonal art, and called attention to the effect of a design standing out from the wall or pavement which, if felt by the hand or foot, is perfectly flat. He next proceeded to point out the forms of the tessera and geometric figures which had hitherto been used in combination to produce design, and pointed out the beauty and variety of design which might be obtained by the combination of a form of tessera, which, although not new, had not up to this time been used as the base of a pattern. The figure which was pointed out as most applicable to mosaic decoration was the triangle of Plato, any number of which might be arranged round a point, and made to cover an entire surface to form bands either horizontally, diagonally, or any variety of diamond figures; as degrees, the sides of the triangle bear a peculiar ratio, namely, 30, 60, and 90—whereas where figures of inharmonious ratios are used the same variety cannot be obtained. Afterwards Dr. Harding made some remarks as to the uses to which the various cups and vases excavated by him had been applied, and gave the following quotation from an ancient Greek play, as illustrating the purpose to which the lecythé had been applied. The play is one in which a young man is represented as jeering an abandoned old woman, and saying—

"But you old wretch, I greatly dread your lover."

"Who?"

"Why that first of Artists."

"Who is that?"

"He who for dead men paints the lecythé."

Another quotation, given as pointing out the use of these vessels, is as follows—

"You left me like a corpse laid out, only uncrowned, and with no lecythés on me."

PROJECTED WORKS, &c.—Tenders have been called for by advertisement, for the repair and restoration of Ware Church, Herts; various branches of artificers for the ordnance department; the erection of a new church at Bristol; a parsonage house in Durham; six almshouses at Ely; a lock-up house at Hartlepool; iron railing and gates for the parish of Isleworth; the construction of several oval sewers at Bristol; and the supply of 5,700 tons of wrought-iron rails, 2,000 tons of cast-iron chairs, and 51,000 sleepers for the Shropshire Union Railways.

ROYAL INSTITUTE OF ARCHITECTS.—On Monday night last an ordinary meeting was held: Mr. C. Fowler, V.P., was in the chair, and Mr. A. B. Blenkarn was elected an associate. Mr. Fergusson read a very interesting essay on the ancient Buddhist architecture of India, which was illustrated by a large number of drawings. He said the subject was one of extreme complexity, and he must assume that none there knew any thing about it. If they did, they must have had access to information not generally known, for before he visited India he had read every work that was published on the subject, and obtained all the information that could be had, and yet when he got there he found all that he had done was of no use. What Mr. Fergusson put before the meeting was the result of his own observations, and our readers will doubtless be glad to have some of the information in his own words: this we will give them in another number.

SMOKY CHIMNEYS.—Sir: From observation and practice I find the cause of smoky chimneys to be the descent of air down the flue, which is often attempted to be cured by placing cowls of different shapes on the tops of the flues, and at other times by placing horizontal pipes under the floors and under the hearthstones to bring in air: this frequently fails, as the weight of air down the flue is too powerful for that introduced by the horizontal pipes. I have always found that to effect a certain cure the draft to the fire must be powerful, and I have cured the most obstinate smoky shimneys by the following method, viz., by introducing an air trunk of zinc, wood, &c., from the top of the chimney-stack down to the side of the fireplace. In new buildings preparation could be made at the commencement, by forming a second and smaller flue by the side of the smoke flue. This would save expense, and prevent the deformity of the house by cowls.—WM. ROWE.

THE BURIAL QUESTION.—The exposure of the vault or cellar under Enon chapel, Clement's-lane, Strand, in which during sixteen years some 10,000 bodies have been deposited, to spread disease and death throughout the neighbourhood, has considerably advanced the downfal of the revolting system of intramural burial. No one can realize, without a visit, the horrors of this den, over which, be it remembered, numbers of persons were congregated every week for divine service, while, at another time, the chapel was actually converted into a "ball-room!"

DOOR-SPRINGS, of new invention, have been patented by Mr. Cotterill, of Birmingham, the principle of which, according to an informant, consists simply of a spiral spring, inclosed in a cylinder acting on a piston-rod, to which the opening of the door gives the momentum, and it does double duty by the addition of a joint at the point where the spring is at its utmost depression, by means of which the backward action of the piston is checked, and the door kept open at pleasure.

THE NEW HOUSES OF PARLIAMENT.—On Thursday in last week, Sir R. H. Inglis brought forward his motion for the appointment of a Committee to inquire into the state of the works, &c., but withdrew it (after a debate), with the understanding that Lord Morpeth would advise her Majesty to issue a commission for the purpose.

BLIND BUILDERS IN WALES.—The following is a list of the tenders given on the 28th of February, for building a national school at Abergavenny:—

Williams, Pontypool	£1,590	0	0
Danniel, Crickowell	1,350	0	0
James, Newport	1,325	0	0
Bowen, Pontypool	1,300	0	0
Evins, Abergavenny	1,220	10	0
Jones, Abergavenny	1,086	0	0
Garnstone	1,054	9	2
S. Jones, Abergavenny (accepted)	977	10	6

CONSTRUCTION OF SEWERS.—A manufacturer at Newcastle-on-Tyne, announces a new material for the construction of sewers. Six feet lengths of a sewer 3 feet 11 inches high, and 2 feet 6 inches wide, are put together in four pieces of this material, and if to be subjected to much hydraulic pressure, are secured by galvanised iron hooping.

TENDERS

For erecting the new British Lying-in Hospital and a house adjoining, in Endell-street, Long-acre. Messrs. Fuller and Gingell, architects:—

T. Burtenshaw	£6,238
J. Thompson	6,066
Heast and Moon	6,056
M. Patrick	5,985
R. Robinson	5,900
Cooper and Davis	5,740
W. Hill	5,628
W. Higgs	5,584
B. and E. Curtis	5,319
J. Glen (accepted)	5,148

MEETINGS OF SCIENTIFIC BODIES

Held during the ensuing week.

TUESDAY, March 14.—Institution of Civil Engineers, 8 P.M.

WEDNESDAY, 15.—Society of Arts, 8 P.M.

THURSDAY, 16.—Royal Society, 8½ P.M.; Society of Antiquaries, 8 P.M.

SATURDAY, 18.—Institute of Fine Arts, 8 P.M.

TO CORRESPONDENTS.

Received.—"R. B.," "L. and N.," "J. R. H.," "E. J. W.," "J. J.," "Competitor," "W. H.," "T. L.," "Dr. McC. (next week), "T. B.," "J. R.," "Six (?) Years' Subscriber" (we do not know), "Col. M.," "J. T.," "J. T. A.," "A Subscriber," "W. C.," "W. W. W." (we will visit the building), "Querer" (we cannot conveniently reply), "E. L." "B.," "F. J.," "A. B.," Brighton (the register office is not available for the new invention named), "Architect's clerk," "Christo" (the request would doubtless be complied with), "E. C. X."

"*Books, Prices, and Addresses.*"—We have not time to point out books or find addresses.

ADVERTISEMENTS.

ART UNION OF LONDON: incorporated by Royal Charter.—The Subscription Lists for 1848 will CLOSE on the 31st inst.—Each Prizeholder at the Annual Distribution will be entitled to SELECT FOR HIMSELF a Work of Art as heretofore. Every Subscriber will receive for each Guinea an Impression of "The Prisoner of Gisors," engraved by F. Bacon, after E. H. Wehnert, now printing, and a quarto edition of Milton's "L'Allegro" and "Il Penseroso," illustrated by Wood Engravings by thirty leading Artists. Specimens of the engravings may be seen at the office.

GEORGE GODWIN, } Hon. Secs.
LEWIS POCOCK, }

4, Trafalgar-square, March, 1848.

PUBLICATIONS.

THE ARTISAN CLUB ON THE STEAM ENGINE.
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By a PRACTICAL SURVEYOR.
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RAISING THE TUBULAR BRIDGE OVER THE RIVER CONWAY. The most stupendous engineering work ever undertaken, the tube measuring 412 feet in length, and weighing 1,300 tons, and lifted in one mass. The following beautiful Engravings, prepared under the superintendence of the Engineers of the Chester and Holyhead Railway, will appear in

THE ILLUSTRATED LONDON NEWS,

Of SATURDAY, MARCH 11, 1848; accompanied with a complete description of the work:—

1. The Tube on the Platform, with the Pontoon for floating it.
2. Floating the Tube to the Pier.
3. The Tube at the Pier, in Process of Elevation.
4. The Tubular Bridge complete.

In addition to the above large engravings, will appear illustrated details of all the machinery employed in raising the Tube, shewing the Great Hydraulic Ram, &c.; with a section and details of the Tube, illustrating its peculiar construction.

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JOHN PETHERAM, 98, High Holborn.

ATKINSON'S CEMENT.—WILLIAM WOOD, Jun., Manufacturer of Roman, Portland, and Bath Cement, Blue and White Lias Lime Works, CHURCH STREET, ROTHERHITHE, London, Sole Consignee of Atkinson's Cement.

KEENE'S PATENT MARBLE CEMENT forms an exceedingly hard and indestructible Stucco, which may either be prepared for paint, or finished in imitation of stone, by the addition of Portland or other stone dust.

It is a cheap and efficient substitute in place of wood for skirting, architrave, and other mouldings, in its application for which purpose it checks the progress of Fire and the attacks of Vermin.

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PORTLAND CEMENT, solely Manufactured by W. ASPDIN, Son of the Patentee. This Cement has been proved, for upwards of twenty years in the Thames Tunnel, to resist the action of water; it is stronger in its cementitious qualities, harder, and more durable than any other description of Cement; it does not vegetate, oxydate, or turn green; nor is it affected by any atmospheric influence whatever, the climate resisting alike the action of frost and heat. It is manufactured to set in from five to sixty minutes. For all purposes that Cement is applicable the Proprietors challenge competition.—Orders received by Messrs. ROBINS, ASPDIN, and GOODWIN, at their Manufactory, Northfleet, Kent, and their Wharf, Great Scotland-yard, Whitehall.

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For the floors of halls and fire-proof warehouses, its lightness, durability, and uniform surface give it an immense advantage over stone, being, at the same time, much more economical. The most satisfactory references can be given. To be had of the Patentees, Plaster of Paris and Cement Manufacturers, 186, DRURY LANE.

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24th February, 1848.

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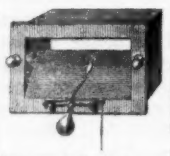

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SMOKY CHIMNEYS—NO CURE, NO PAY.

Twenty-five years' extensive experience in all the branches of a stove manufacturing business, and the cure of smoky chimneys of every description, fully justifies F. E. in stating that he can undertake the cure of smoky chimneys on the above equitable terms.

GRANT'S PATENT ROTARY WIND-GUARD, for the prevention of Down Draughts and Smokey Chimneys, by discharging cure of a Strong Current of Air at the Mouth of Chimney-Pot. The attention of the Public and the Trade is respectfully solicited to this simple Apparatus. The Patentees guarantee its effecting the purposes named. Let the wind blow from what quarter it may, it is not liable to derangement; can be easily and cheaply applied, and does not in any way interfere with the Sweeping the Chimney. —Manufactured by the Patentees, LAMBERT and GRANT, 21, Elizabeth-street, Eaton-square.

WILSON and Co.'s PATENT VENTILATING CHIMNEY-POT, for the Cure of Smoky Chimneys, has been tested extensively throughout the Kingdom for the last three years, and has proved to be an effectual remedy.

The Patent Pots cannot corrode or get out of order, and can be effectually swept by the sweep's machine.

J. W. and Co. had the honour of fixing upwards of fifty of the Patent Ventilating Chimney Pots, in artificial Stone Cement, on the chimneys of Buckingham Palace; since which a number have been fixed at Windsor Castle.

The Patent Pots have proved to be the most effectual invention ever yet discovered, and also unrivalled for their ornamental appearance; they are manufactured of artificial Stone Cement, Iron, or Zinc.

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BIELEFELD'S IMPROVED PAPIER MACHE, which has been almost universally adopted for architectural decoration, has been patronized by her Majesty, by the Honourable Commissioners of Board of Works, by the highest of the nobility and gentry, and by the most eminent architects of the day. It has been used at the royal palaces, at the present House of Lords at Dublin Castle, at Drayton Manor, the new Conservative Club House, Grocers' Hall, &c., also at the British Museum and Pantheon Bazaar, where it has been extensively used for some years, and an inspection will sufficiently establish its superiority over every other kind of composition, both for beauty and durability. Designs prepared for the decoration of ceilings, panelling of walls, &c. A volume of enrichments, containing more than 1,000 designs of the papier mâché ornaments, with a tariff, price 21.—Works, 15, Wellington Street North, Strand.

LONDON MECHANICS' INSTITUTION, Southampton-buildings, Chancery-lane.

The Public are respectfully informed that LECTURES on the following subjects will be given in the course of the present Quarter:—

H. M. NOAD, Esq., on Electro-Magnetism and Magneto-Electricity.—G. F. RICHARDSON, Esq., on Geology, illustrated by Dissolving Views.—J. L. HATTON, Esq., on the Vocal and Instrumental Music of S. Bach, Handel, Mozart, Beethoven, Mendelssohn, W. Sterndale, Bennett, &c. &c.—THOMAS COOPER on the Life and Genius of Robert Burns and of Lord Byron.—Mr. HANNA, on some of the British Poets of the present Century.—C. H. CHEVERSTON, Esq., on the Chemical Properties and Physiological Effects of Ether and Chloroform.—HENRY SMITH, Esq., Musical Entertainment.—H. HERSEE, Esq., on the Use and Abuse of Satire.—W. SHUTER, Esq., on Trial by Jury.—E. C. SALISBURY, Esq., on the Causes of the French Revolution.—W. BALL, Esq., History and Progress of the Ballad Literature of the Kingdom, and on our Ballad Literature, Ancient and Modern, Serious and Comic. —Mrs. C. L. BALFOUR, on Self-Culture, and on Popular Fallacies and Social Anomalies.

Prospectuses, containing particulars, may be obtained at the Library of the Institution. A. M'FARLANE, Secretary.

THE FRENCH REVOLUTION and FRENCH PAPER-HANGINGS.

Messrs. MARKS and Co. beg to inform the Trade that the greatest tranquillity exists at present in all the Paper-hanging Fabriques; that their new Spring Stock, embracing every novelty, is at the warehouse, at the lowest Paris prices with the duty. Also a number of expressly-made original designs, printed here, free of duty, at prices varying from 8d. to 3s. per piece of twelve yards long.

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TO BRICK AND TILE MAKERS.

THE AINSLIE BRICK and TILE MACHINE COMPANY (James Smith, Esq., of Deanston, Chairman) invite attention to their improved Brick and Tile Machines, which are to be seen at work at Alperton, and at the Company's office, 193A, Piccadilly, from Ten a.m., to Five p.m. Mr. Robert Scrivener, who has been appointed manager in the room of Mr. John Ainslie, will show the machines at the works at Alperton, which is within a mile of the Sudbury station of the London and North-Western Railway, and two miles of the Ealing station of the Great Western Railway; also at the Polytechnic Institution, Regent-street, London.—All communications to be addressed to Mr. WILLIAM GORDON, Secretary, at the office of the Company, London, 193A, Piccadilly.—March 1, 1847. These machines may also be seen at Mr. Slight's, Leith-walk, Edinburgh; Mr. Robert Boyle's, Ayr; Mr. Lawrence Hill's, 135, Buchanan-street, Glasgow; Mr. Robert Charles', Mill-hill, Leeds; Messrs. Penny and Finch's Penkridge, Staffordshire; Messrs. Drummond and Son's, Dublin; and Mr. John Connor, Newton Lindvady, County Derry.

TO GAS COMPANIES, Gas Fitters, and Gas Consumers.—N. DEFRIES, 10, Hampstead-road, 67, St. Martin's-lane, and 118, Argyle-street, Glasgow, having proved by eight years' experience his DRY METER to be unrivalled, begs to say, that nearly 20,000 are now in use, defying injurious Gas, and are never affected by Heat, Damp, or Frost. They may be obtained on Hire of all the Gas Companies who supply Meters to their Customers.—Testimonials of great value may be obtained at either Factory.

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MESSRS. F. and J. HARLAND beg to call the attention of Builders and others to the following list of prices, for cash:—

2-inch Pipe .....per foot	4d.	3½-inch Gutter ....per foot	4½d.
2½ ditto	4½d.	4-inch ditto	5d.

Including fixing.

Flats Covered and Cisterns Lined from 4½d. to 6d. per foot superficial; Cornice Gutters, 5d. to 7d.—No. 3, Cumberland-place, Newington, Surrey, opposite to the Fishmongers' Almshouses.

N.B. Orders by post punctually attended to.

SNOXELL'S PATENT SAFETY REVOLVING WOOD SHUTTERS, Manufactory, 96, REGENT-STREET and 121, CHANCERY-LANE. Patent sealed on the 4th day of February, 1845, for Fourteen Years, for Improvements in Revolving Shutters of WOOD and IRON, consisting of Six Methods of Raising and Lowering Shutters, without Machinery, and Two for Hinging and Sheathing the Edges of Wood Laths with Iron.—The Patentee having fixed up some hundreds, will feel pleased in forwarding the Testimonials of Architects, Principals of large Establishments, and others, having them now in use, which fully guarantees the Patentee in stating they are beyond dispute superior to any other Revolving Shutter for durability, security, and simplicity, without the use of cog-wheel worm and screw gear or any other complicated machinery employed by other makers.